esser

MIND HERE'S AT'LL

HOW AND

GIVE FORE

with

ings.

nills.

want

eady

er or

ad-

mite,

19-

HOWARD CAMPBELL, Editor

Volume 9

MAY, 1937

Number 12

CONTENTS

ı	A
ı	Magazine
ı	for
ı	Mechanical

Executives: Construction Production

Maintenance

Member

More Than 27.000 Circulation Each Issue

	INGENIOUS DEVICES SAVE TIME IN MACON SHOPS OF CENTRAL OF GEORGIA RAILWAY
	OUR EMPLOYEES KNOW OUR BUSINESS
	HYDRAULIC POWER AND ITS APPLICATIONS TO MODERN INDUSTRY, III
	NEW SPINDLE NOSES AND CHUCKS REPRESENT ADVANCE IN DESIGN
	A DISCUSSION OF REACTIVE OR SPRING WASHERS108 By H. H. Talboys
ı	YOUR INSURANCE PROGRAM "BOILED DOWN"114 By W. F. Salway
	IDEAS FROM READERS —Cutting Large-Diameter Plates at Low Cost, By John A. Honegger
	—Calibrating Compression Springs, By C. F. Fitz

-Quick-Acting Work Support, By Chas. H. Willey......134 -Colloidal Graphite Prevents Seizing of Threads, INDEX TO ADVERTISEMENTS......258

Published monthly by Gardner Publications, Inc., 431 Main St., Cincinnati, Ohio. Copyrighted. Entered as third class matter at the postoffice of Columbus, Ohio, under Section 5741/2 P. L. & R. and accepted under the act of June 5, 1934. authorized March 11, 1937.

DON G. GARDNER, President and General Manager JOHN M. KRINGS, Advertising Manager

IVER W. LEE Pacific Coast Manager 122 East 7th St., Los Angeles Phone Vandike 3916

Western Manager Tribune Tower Chicago Phone Sup. 8329

GEORGE H. MEYERS GRANVILLE M. FILLMORE
Western Manager Eastern Manager 342 Madison Ave. New York Phone Murray Hill 6-3899

Vari Mae gia the

mos



2½ x 40" J&L SADDLE TYPE TURRET LATHE

Machine Shop

CINCINNATI, OHIO

MAY, 1937

Vol. 9, No. 12

Ingenious Devices Save Time in Macon Shops of Central of Georgia

By HOWARD CAMPBELL

If THE considerations are size, production, general plant layout, and variety and quality of equipment, the Macon shops of the Central of Georgia Railway are to be listed among the best shops of the country. The most interesting features of the shop include, however, not the standard

machine tools, but the special tools and devices that have been developed from time to time by the members of the shop organization.

Some of these devices were "invented" to reduce a hitherto difficult job to simple terms; others were devised for the sake of accuracy, and



Fig. 1-Machining a radius on a link block.

ing

pui kee

the

dra wo tur

eds

off.

sha

sha

slee

on

rad

pin

sha

On

slee

cor

WOI

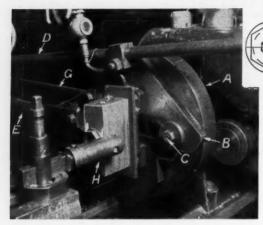
the

reve

clea

tur

T





and locks the link block in position.

still others to prevent waste, but they all have the common objective of saving time or money. Through the courtesy of the Central of Georgia we are privileged to present some of these tools and devices here.

Machining a radius on a piece as wide as a link block usually presents a problem, but the problem is greatly simplified when such a device as that shown in Fig. 1 and 2 is used. The device consists primarily of the face-plate indicated as A in Fig. 2, to which the plate B is connected by the stud C. The two plates are not locked rigidly, however; the nut on the stud

holds the plates just tight enough for a sliding fit. The stud carries a roller which is a running fit in the slot in plate B; thus as the faceplate A revolves, plate B is reciprocated vertically, carrying the link

block up and down with it. Both to guide the plate B

and to govern the amount of radius, this plate is attached to the rods D and E, which

in turn are supported by the bar G. The joint J can be moved on the bar to obtain the radius desired. The tool is held in the toolholder H and the usual feed is used. A sight-feed lubricator supplies oil to the contact-surfaces of the plates.

To provide means for anchoring the link block, the bracket on plate B carries a stud that is threaded to fit a female thread in a cylindrical nut, designed as shown in Fig. 3. The hex head provides for a wrench, and the taper under the head centralizes the workpiece as it is tightened.

The toolholder, itself, is of interest-

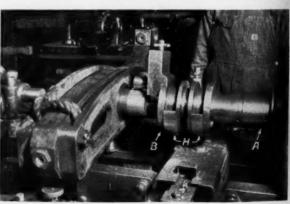


Fig. 4—Turning trunnion bearings on a link.

Fig. 6—Boring a relabbitted motor bearing, using a spring chuck.

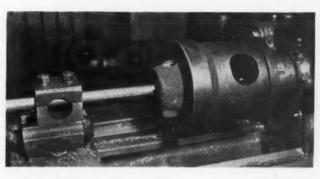
ing design, the purpose being to keep the point of the tool from dragging on the work on the return stroke, and thus prevent the edge being worn

off. The holder consists of the usual shank, to which is attached a short shaft. The toolbit is carried in a sleeve which is bored to a sliding fit on the shaft. The sleeve has a short radial slot which is a sliding fit on a pin that projects upward from the shaft, thus forming a bayonet lock. On the down, or cutting, stroke, the sleeve turns to hold the tool in the correct position for cutting. As the workpiece rises on the return stroke, the pressure on the point of the tool revolves the sleeve until the necessary clearance is obtained.

Trunnion bearings on links are turned with the tool shown in opera-



Fig. 5—Attached to the shank clamped in the belost is a "follower" which transmits machine feed to the turning tool.



tion in Fig. 4. The trunnion pins are steel bushed, and the bushings are pinned in place; thus whenever the pins become too badly worn, the pins are knocked out, the old bushings are removed, and new bushings are put on and turned to the required size. By this means a link can be kept in service indefinitely.

The head that carries the tool slide is made in two parts; the part indicated as A, which is threaded to screw onto the spindle nose, and the part B, which carries the tool slide and is made to a sliding fit on the sleeve A. Part B is keyed to part A so that, while it can slide on part A, it must necessarily revolve with the spindle.

To operate, the link is anchored in position on the bed of the lathe, and the tool is set for the diameter required. The part carrying the tool is fed longitudinally by means of the piece C in Fig. 5, which is made to the shape of a tool shank and has attached to it the piece D. The part D is of a width which will be a sliding fit in the groove in which it is shown; thus when the machine feed is applied, the part B, carrying the tool slide, is fed as required. To obtain cross-feed for facing, a formed piece E is placed on the rear end of the shank C so that the star wheel W will strike it at each revolution of the spindle. It will be noticed that two counter-weights H, Fig. 4, are

howing

1937

e "bayig. 3—
tralizes
osition.

th it.

ate B

int of

ached
which
ar G.
e bar
The
I and
sight-

te B to fit l nut, he hex d the s the

erest-

tri

tak

bus

lus

is !

gir

and

use

cut

too to 1

in :

aux

spi

7

sho

hal

provided to counterbalance the tool slide.

All motor bearings wear, in time, and there are certain types of motor bearings which are difficult to hold equipped with a fixture that holds seven shoes and eight wedges. The interesting feature of this set-up consists in the air-operated toolholders. Each toolholder is made to hold four

tools, and when working on cast iron, both sides and the center can be planed simultaneously.

The toolholders are slightly heavy, however, and it was discovered that as pieces on the re-

the tools dragged against the workturn stroke, the cutting edges were dragged off. To eliminate this difficulty, each toolholder is equipped with a horizontal stud that is connected to a vertical air cyl-

inder in such manner that the down-

ward movement of the piston will

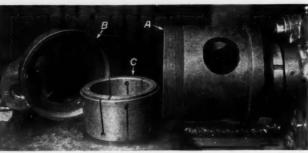


Fig. 7-Showing the chuck disassembled.

for reboring after they have been rebabbitted. To simplify this task, the chuck shown in Fig. 6 was made. The design is very simple, the chuck normally consisting of but four pieces, as shown in Fig. 7. The chuck proper,

A, has an adapter which screws onto the spindle nose, and the chuck is threaded for the nut B. The inside of the chuck is tapered to receive the tapered split bushing C. With the bushings in the chuck, the workpiece is placed in the bushing and the nut is screwed on, forcing the bushings in until the workpiece is gripped firmly.

The operator shown in Fig. 8 is at work on the well-known job of planing shoes and wedges, for which the planer is



Fig. 8-The toolheads are raised by air on the return stroke, the saving the cutting edges of the tools.

cause the stud to rise and thus swing the toolholder upward enough so that the tool will clear the work. The air . 1937

holds

. The

ip conolders.

ld four

when n cast

sides

center

planed

holders

ghtly

wever.

s dis-

nat as

ragged

work-

the re-

e, the

ff. To

swing

o that

he air

usly.

supply to the cylinders is governed by trips on the side of the machine table. which engage the air cocks as the table moves backward and forward.

A unique method of turning the hushing fit on a tumbling shaft is iljustrated in Fig. 9 and 10. The shaft is held between the centers of an engine lathe, which align it properly, and further support is obtained by the use of a steady rest, as shown. The cutting tool is carried on a rotating toolhead in a fixture that is clamped to the cross slide of the lathe as shown in Fig. 9, and power is supplied by an auxiliary shaft driven from the lathe

The rotating toolhead is geared, as shown in Fig. 10, and is made in halves so that it can be disassembled to permit setting up with the shaft in position for turning. In Fig. 10

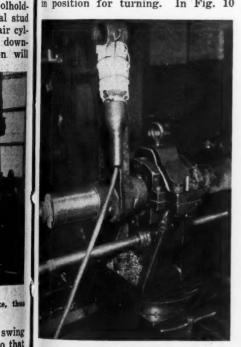
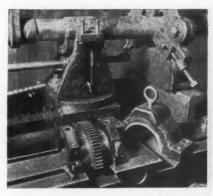


Fig. 9-Turning, a bushing fit on a tumbling



-The toolholder is made in halves and ntegral with a gear by which power is transmitted to it from the headstock. integral

one half of the cutterhead can be seen still in the fixture, the other half having been removed so that the mechanism can be seen. To assemble, the two halves of the head are bolted together, then the bearing cap is bolted over the head to the fixture.

To obtain the necessary rotary movement of the head, a pinion in the fixture meshes with the teeth of the gear on the cutterhead, the pinion being driven by a shaft which, in turn, is driven by gears from the spindle The driving gear of the machine. screws onto the spindle nose, and the head end of the shaft is supported by a bushing which has been set into the front face of the headstock.

Ports in valve chamber bushings, which in many shops are milled with end mills, are machined here with side milling cutters as shown in Fig. 11. The most important factor in the set-up is, of course, the fixture, the design of which is so obvious that it needs no description. The bushing is laid out in the usual manner, and when located for milling a port, the table is fed vertically until the cutters are well into the work and then the table is fed longitudinally until the correct length of the port is obtained. The cutters are %x44 in. This

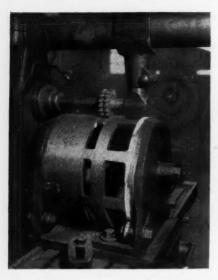


Fig. 11-Milling ports in a valve chamber bushing.

method of milling ports is the fastest ever seen by the writer.

The extent to which railroad mechanical executives are keeping abreast of modern developments is indicated by the use of the spray gun for painting locomotives, illustrated in Fig. 12. The two lengths of hose connected to the gun extend to the paint tank and shop air-line connection, respectively, air being used both to force the paint to the gun and to atomize it as it is "shot" out of the nozzle. Not only can the paint be sprayed much faster than it can be brushed on, but a more even coat can be applied and the operator can

plied and the operator can

Fig. 12—The spray-gun provides a quicker, cheaper, and more efficient method of painting the locomotive.

easily spray the paint into recesses and under pipes and other accessories where hand painting would be more difficult.

Origin of Horse-Power

N James Watt's scrapbook, which is now in the Birmingham Reference Library, appears under the date of February, 1782, his detailed computation of horse-power, based upon the experiences of Wrigley, his millwright. At that time horses were employed to drive mill machinery, and Watt estimated that the average cart horse developed 22,000 foot pounds of work per minute. Anxious to give good value to the purchasers of his steam engine, Watt, in using the term "horse-power," increased his estimate by 50 per cent, and thus it came about that the 33,000 foot pounds per minute formula was evolved.

(From "Industrial Britain.")



esses

more

r ula which leferdate comupon mille em-, and cart ds of give f his term imate about minin.")

HAVE YOU A COPY OF THIS LATEST BULLETIN?





Write for Bulletin R-21A today. It may lead to lower overhead rates in your shop as it has in many others.

THE CINCINNATI BICKFORD TOOL CO

Our Employees Know Our Business

It is the author's opinion that most of the difficulties between employers and employees could be eliminated if employers would take the trouble to educate their employees concerning the factors involved in the conduct of a successful business.

BY GEORGE S. WHYTE
President, MacWhyte Company, Kenosha, Wis.

THERE is an old saying to the effect that "one half of the world doesn't know how the other half lives." What seems to me to be a more important fact is that one half of the world doesn't know how the other half thinks—because that fact is undoubtedly responsible for a large part of the friction which periodically crops up here and there between employers and employees.

As a young lad I served my apprenticeship in the foundry and machine shop, and it was during those years in the shop that I gained an education in the working of the average human mind which has been of inestimable value to me ever since. There is only one way to learn just how and what the average workman thinks, and that is to be a workman. Among other things, I learned that there were some highly intelligent men among the mechanics, although in many other cases the ability of the individual to think was as limited as his education. But one of the most important facts that came to my attention was the general ignorance of the workmen regarding the principles involved in the operation of business.

In the absence of fact, rumors flourish, and in the course of time I became acquainted with all the current speculations concerning the large profits that were being harvested from the exploitation of the laboring man. The impressions I gathered during those years left their imprint, and through the years I have continued to carry the idea that, in some respects, labor was not getting the right kind of a deal from management.

In making this statement, I do not refer to wages; rather, I am referring to the attitude of management in withholding from the employees all information regarding the business, its objectives, its difficulties, and its condition. Management, generally speaking, has taken the attitude that, when it gave a workman the job that he asked for, its responsibility to that workman ceased and that as long as the workman received the agreed amount for his labor, the obligation of the employer to the employee had been fulfilled.

I am not questioning the right of the employer to that stand, but I am questioning the wisdom of it. The way to make a man responsible is to give him responsibility. The way to make a man take an interest in you and your business is to take an interest in him and his business, and the best way for an employer to es-

DET

en emwould factors

he large arvested

laboring

red dur-

int, and

ntinued

ome re-

ing the

nanagedo not a referagement yees all usiness, and its erally de that, job that

long as

agreed ligation

yee had

right of

nt I am it. The

le is to

way to

in you

an inss, and

Murchey COLLAPSIBLE TAPS

DIE HEADS

MURCHEY Standard Collapsible Machine Taps are offered in all sizes from 11/4" to 12" and in types for stationary and revolving spindles. your special threading needs MURCHEY Taps can be adapted for long threads, blind holes, etc.,

and can include boring, reaming and chamfering tools. Send blue prints or samples for recommendation on your particular needs. No obligation.

MURCHEY Type to that "6" Self-Opening Die Head for Hand Screw Machines, etc., where

de head does not revolve. 1/16" to 6" inclusive. Chasers and many parts are interchangeable with other MURCHEY Die Heads.

Other MURCHEY Precision Threading Equipment—No. 11 and No. 22 Threading Machines, Solid Adjustable Taps and a complete line of Self-Opening Die Heads.

RCHEY MACHINE & TOOL CO

to es-DETROIT

MICHIGAN

tablish this mutual interest is through letting the worker understand that the success of the firm as a whole depends upon the success of each individual in his job.

Too often a man is hired and put to work on a task which is uninteresting and which becomes more so with repetition. In many cases he has no idea of what his operation is for, nor of its relation to the finished product. His ideas regarding the conduct of the business are even more vague, and thus his mind is in perfect condition for the reception of ideas—good or bad.

It has always been my belief that the relationship between the employee and the management should be as close and friendly and confidential as it is possible to make it. Weeds and tares have a hard time sprouting in a field that is properly cultivated, and the employee who has been taken into the confidence of his employers concerning the standing of the firm's product in the field, the markets, competition, material costs, service expense, overhead, and so on, will have a better appreciation of his task and a finer sense of loyalty to his firm than the worker who is allowed, through neglect, to feel that he is simply a cog in a machine that is too vast for him to comprehend.

It has been a part of our policy to encourage friendliness both among the employees themselves and between the employees and the management. We have taken every opportunity to enable our people to get together outside of working hours, and thus to become better acquainted with each other, with their department heads, and with the officials of the company. A number of activities have been developed, both social and athletic, most of which are supervised by the MacWhyte Club. The club was organized in 1919 and is the energizing influence in the major part of

our recreational activities.

The MacWhyte annual picnic has been an annual event for the past 20 years. Each Christmas for the past 10 years we have held a Christmas party at which one of the company officials plays the role of Santa Claus—to the great delight of the children for whom the party is arranged. A playground adjacent to the office is used as a playground, and is large enough to accommodate a baseball diamond, football, swings for the children, and so on.

The MacWhyte Bowling Team is a member of the local Industrial Bowling League, and always stands well toward the top. We have had basketball teams, and we have a soft ball team which plays both winter and summer. We had a soccer football team for several years, but the MacWhyte team was champion for so many years that they became tired of it and disbanded.

One of our most important recreational units is the MacWhyte Golf Club. The members hold an annual tournament in which only those who can play down in the 80's are likely to have a chance. A very popular unit is the orchestra, composed entirely of men employed in the factory. The MacWhyte Club also sponsors a troop of Boy Scouts, most of the boys being from the neighborhood of the plant.

Not the least important is the credit union, which is operated by MacWhyte employees. The union is being operated in an entirely satisfactory manner, and a good percentage of the employees are members. The employees have a benevolent association which serves a very good purpose, in addition to which the MacWhyte Company carries group insurance on a contributary plan with the employees.

The Personnel Department plays a very important part in the relationship between the management and the

Sol

pe

T

y, 1937

nic has past 20 he past ristmas ompany a Claus children

ged. A office is s large paseball he chil-

m is a Bowlis well basketft ball er and ootball e Mac-

for so

tired recree Golf annual e who likely r unit

ely of The troop being plant. s the

ed by on is satisrcentbers. it as-

good Macnsurh the

ys a tiond the























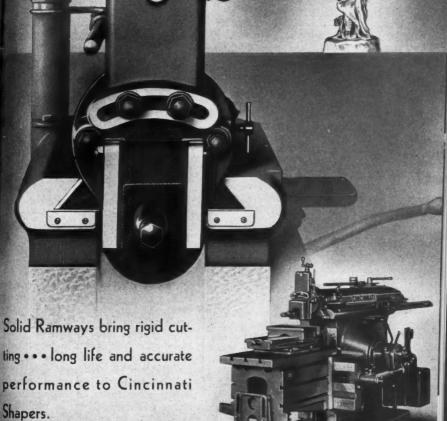


Shapers.

.







employee. When a MacWhyte employee fails to report for work without due notification, his absence is immediately reported to the Personnel department. Before 11 o'clock of the first morning of absence a personnel director is at his home. Oftimes the director finds that there has been a death in the family, or that there is sickness or some other kind of trouble in the home, and thus an opportunity is presented for him to lend a helping

"The way to make a man take an interest in you and your business is to take an interest in him and his business."

"Weeds and tares have a hard time sprouting in a field that is properly cultivated . . ."

". . . the stockholders, the company officials, and the members of the manufacturing organization are united in a common purpose-to perform a service through the creation and distribution of our product and thus justify our place in the world."

GEORGE S. WHYTE.

hand. The personal interest of the company as represented by the personnel director is usually greatly appreciated at such a time and results in bringing the company closer to the home folks. I believe that the attitude of the wife and the family towards the company is just as important as the attitude of the employee himself.

Some two years ago we decided that it would be better for all concerned if our employees had a better understanding of the business in which they were engaged, and it was our opinion that each man would be genuinely interested in knowing just how we operate, just how much money we receive, just how much of this money goes for labor, how much for

materials, and so on. To this end we called a meeting of the employees, and it was well attended, indeed.

The MacWhyte merchandising methods were outlined, and the difficulties encountered in obtaining orders were explained. The employees were told about the competition that exists in the market, about the number of manufacturers engaged in the same line of business, and about the task that confronts our salesmen. The necessity of successful merchandising was emphasized, and the point was made that the ability to market our product is just as vital to the success and welfare of the individual as it is to the success of the company.

Stress was laid on the fact that the task of selling MacWhyte wire rope is made much easier when each and every worker does his level best to produce the best wire rope possible.

An important part of the session was a complete exposition of the company's financial set-up, the various points discussed being illustrated by the use of simple charts, about 3x5 feet in size, upon which the figures could be presented so that they could more easily be visualized. The first chart was the familiar chart of American business during the past 100 years. The chart shows the recurring peaks of prosperity and valleys of depression and thus illustrates the instability of business. This provided an opportunity to emphasize management's greatest problem—to lay plans and build for the future so that the business can carry on during times of stress and tribulation, as represented by the valleys on the chart.

To illustrate the manner in which this problem is met by our company, de on charts representing the financial setup for the previous 12 years were diame used. Among these were:

(1) A vertical-bar chart of the dollar-volume of sales by years, each year being divided into colored blocks is ne ingle design speed

e in n

rid ba TVY lo son li may er...i

mish t al for ent set ale di

furthe

ning co

Tu



to show the proportion of income spent for materials, labor, factory and general overhead, selling expense, taxes, and profits.

- (2) A vertical-bar chart showing the ratio between profits and taxes, and focusing attention upon the rapid growth of the latter.
- (3) Two circular charts, each covering the 12-year period; one representing the sales dollar, divided into sectors illustrating the proportion of each dollar that is disbursed for the items listed on chart 1, and the other representing the profit dollar, with sectors illustrating the ratio of profit to taxes.
- (4) A vertical-bar chart in four sections showing capital expenditures, decreases and increases in indebtedness, decreases and increases in current assets, and additions to and deductions from surplus—all by years—to show where the profits go.
- (5) A vertical-bar chart in two sections, one section representing debts by years, and the other section representing the cash and investment by years to illustrate the gradual increase in indebtedness and improvement in cash position.
- (6) A vertical-bar chart in two sections showing preferred dividends and common dividends, both by years.
- (7) A vertical-bar chart showing the total expenditures over the 12-year period for materials, labor, factory overhead, general overhead, selling expenses, taxes, net profits after taxes, preferred dividends, common dividends, and amount retained in the business. At this point overhead expenses, which factory men are prone to regard as unnecessary evils, were carefully analyzed and explained in order to show how the organization as a whole profits from money that is spent for items other than labor and material.

Each chart was explained very care-

fully, in non-technical language, and at the conclusion of the talk every person in the organization knew where the money comes from and where it goes. The explanation of our activities was well received by the men and many questions were asked regarding details of the business which we were glad to answer.

We believe we are working along the right lines. After all, the stockholders, the company officials, and the members of the manufacturing organization are united in a common purpose—to perform a service through the creation and distribution of our product and thus justify our place in the world.

We take the stand—and our employees agree with us—that those people who invested their savings to found and carry on this business are entitled to a fair return for the use of their money, because if there had been no capital, there would be no factory. We also take the stand that the employees are entitled to a fair share of the profits of the business in the form of wages and salaries based on the ability of the individual and his worth to the company.

Very few manufacturers are making exorbitant profits today; the law of supply and demand, as represented through competition and the leveling of prices and wage scales, takes care of this angle. Still, the average factory workman has a pretty vague idea of the factors involved in the conduct of a business, and it is human nature for him to listen when someone tries to tell him that he isn't getting a fair deal.

It is my earnest belief that if management would be more frank with employees and give them more information as to the details of their business, there would be less trouble in the business world. After all, most troubles come from misunderstanding or lack of information.

Modgers,



finishing a rough spot on a production fixture

Here's the "very latest" in off-hand grinding tools . . . the new Dumore No. 10. Originally custom built for a large automobile manufacturer who wanted EXTRA CAPACITY. Identical in size and shape to the compact, well-balanced Dumore No. 8, it has more than double its horsepower (1/18) and has a third more speed—20,000 r. p. m. It weighs only 2 lbs. 1 oz. and embodies a unique 3-bearing construction that has withstood months of testing under the most severe conditions. Any distributor below will demonstrate this unusual new Dumore tool-without obligation. THE DUMORE CO., Dept. 187-L RACINE, WIS.

DISTRIBUTORS STOCK DUMORE TOOLS

on to by Co.

Re-Handley Hdwe. Co.

Chandler & Farquhar e, Parker & Co., Inc. mbridge) Cutter, Wood &

1937

e, and knew and and

of our y the asked siness

along stocknd the rganpurrough f our ace in

emthose gs to s are e use e had be no that

fair

siness

laries

vidual

mak-

e law

ented

reling

care

fac-

idea

nduct

ature

tries fair

manwith

nforbusile in

most nding derson Co. PORT. CONN. — Hunter

Secretary Co.

Secretary Co.

Alignoria Secretary Secret

ERIE, PA.—H. Weller Sup. Co.
GRANDRAPIDS—Mirs. Sup. Co.
GRANDRAPIDS—Mirs. Sup. Co.
GREENVILLE, S. C.—Carolina
Supply—Hanter & Havens
Holly Oke—Hanter & Havens
Awan & Hanter
Dawnon Sales Co., Inc.
Vonnegut Hardware Co., Inc.
Vonnegut Hardware Co., Inc.
Vonnegut Hardware Co., Inc.
Vonnegut Hardware Co.
Local Control
Michael & Moore Co.
KANSAS CITY. MO.—Elfeldt
Have & Machy. Supply Co.
KNOXYILLE—W. S. Murrian Co.
LOCANCASTER, P.A.—Relly Bros.
& Raub.
LOWELL, MASS.—Nebes
Machy. & Supply Co.
LOCANCASTER, P.A.—Relly Bros.
& Co.
Michael & Supply Co.
Michael & Mi

MOLINE, ILL.—John J.

MOLINE, ILL.—John J.

MONNermoyle Conadian Fairbanks-Morse, Ltd.

Williams & Wilson, Ltd.

MUSERGON, MICH.— MuskeNASHVILLE—BafordBroe, inc.

NEW ARK.—Abrasive Machine

NEW Styley Co.

S. Mersick

Fage, Steele & Fisse

Fage, Steele & Fisse

NEW ORLEANS—Oliver H.

VanHorn Co., Inc.

NA ORLEANS—Oliver H.

ORLANDO, FLA.— Harry P.

PEDRIA—Couch & Heyle, Inc.

PHILADELPHIA—Maddock &

W. Rapp. Machinery &

W. Rapp. Ma

tine & Co.

PROVIDENCE — Belcher & Loomis Hardware Co.
Brownell Machinery Co.
Reynolds Machinery Republic PA. — Reading Machine & Teel Co.

RICHMOND - Smith - Courtney ROCHESTER, N. Y. - Erskine-ROCHESTER, N. Y. — ErrkinsHealy
ROCK FORD, ILL. — Mid-State
SAG Indux. Corp. — Reichle
ST. LOUIS — Colcord Wright
Machinery & Supply Co.
SALT LAKE CITY.—Salt Lake
SAN FRANCISCO — Harron,
Rickard & McCone C.
W. Marwedel
SEATILE—Crasin & Co.
SOUTH REND — South Bend
Supply Co.

Hand Cut

Hand Cut BOTABY FILES

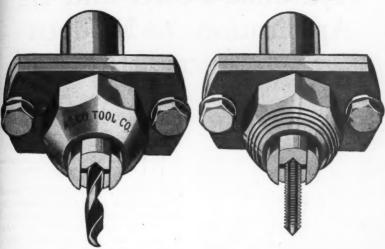
Are made of the finest grade High Speed Steel, turned accurately to size, and cut by hand, to suit the particular operation on which they are used. That is why FORD FILES cut faster, cleaner and last longer. Our engineering service is at your disposal. Hundreds of standard shapes and sizes in stock to choose from. Four standard cuts, coarse, extra coarse, fine and smooth. Special shapes and cuts to meet your specifications, just send us a sample, sketch or blue-print and let us quote you, or may we send you our 24-page catalog showing many sizes, shapes and uses of FORD ROTARY FILES. FORD HAND-CUT ROTARY FILES pay on every job. If your local dealer hasn't your size in stock, write direct to factory.

M. A. FORD MFG. CO.

Pershing Avenue Davenport, Iowa, U. S. A.



NO BUSHINGS!



New ALCO Drill Chucks and Tap Holders Hold Securely WITHOUT BUSHINGS and Insure CONCENTRICITY.....

Think it over. It will be easy for you to determine how this will affect your screw machine production.

Your production costs are reduced; your bushing costs are eliminated; your bushing inventories are wiped out—and your machines will turn out better work.

You'll avoid Tool Room Turmoil by obviating the necessity of stopping important work to make special bushings for special work.

And, notwithstanding these revolutionary features, ALCO Drill Chucks and Tap Holders are simple; a wrench is the only tool required to make a quick and positive adjustment for any size drill or tap within the range of the chuck or tap holder.

If you want to modernize your screw machine equipment and streamline your production, write for details.

ALCO TOOL COMPANY

BRIDGEPORT

PATS. PEND.

CONNECTICUT

hyd

with

with

to e

may ejec

blar

desi

D

fore

plie

by

ated

allo

med

scei

or the

use

the

stro

T

pre

ofte

ten

ind

Thi

aut

loc

K

Hydraulic Power and Its Applications to Modern Industry, III

Metal Forming Presses — Electrical and Aircraft Production — Hydraulic Forging Presses. Other Applications.

TURNING now to the subject of hydraulic machinery in the metal working field, we find that it has been used for a good many years in the operation of bloom and billet shears,

Fig. 16—3200-ton Hydraulic Press installed in an airplane factory for forming metal parts. Moving-up type with motor driven of power unit mounted on top of the press.

BY WALTER L. TANN Hydraulic Engineer, Farrell-Birmingham Company, Ansonia, Conn.

plate shears, plate-bending presses, riveters and other heavy equipment used in steel mills, boiler shops and structural steel fabricating plants. Industry has long accepted the hydraulic principle for the operation of the super-heavy duty machinery but only within the past few years has industry accepted hydraulically-operated machinery for high speed quantity production of metal parts. True, the majority of stampings produced in the manufacturing plants of this country are now made on the mechanical press but the modern high speed hydraulic metal-forming press has met with such an enthusiastic reception that its acceptance as a superior tool for certain classes of work is assured.

Chief among the claims advanced for the hydraulic press in connection with metal working are these:

1—Fewer rejections of stampings and less trouble on assembly of stamped parts. This is due to the peculiar resilience of the hydraulic pressure medium, resulting in a gradual pressure build-up in the final stages of the forming or "ironing" of the stamping.

2—Ease of die-setting and the facility with which dies can be correctly set, doing away with press or die breakage due to incorrect setting, and resulting in longer die life.

3—An almost infinite variation of speed and pressure, as required by the job, and ease of control through the adjustment of a simple pump-control lever or handwheel, located on the frame of the press.

4—Semi-automatic or fully-automatic operating cycles are obtainable, in combination with the advantages listed in the three preceding items.

Metal-forming presses are similar in mechanical design to the basic hydraulic press previously described, with the exception that they are almost always of the down-acting type with the ram and slide moving down to engage the work. They may or may not be equipped with hydraulic ejectors, or hydraulically operated blank-holders, depending on the die design and character of the work.

Due to the high speed required before the actual high pressure is applied to the ram, the cylinder is filled
by means of an auxiliary pilot-operated prefilling valve, which opens and
allows the oil used as the hydraulic
medium to fill the cylinder as it descends, either by the force of gravity
or in addition, the force exerted by
the auxiliary pistons. These are also
used to raise the ram and slide to
the upper position on the return
stroke.

To speed up the operation of the press, a moderate air pressure is often applied to the oil tank to hasten the flow of the oil into the cylinder through the prefilling valve. This pilot-operated prefilling valve is automatic in operation, and is interlocked either hydraulically, pneumat-

ically or electrically with the press control system, operating in sequence with the other movements of the press.

The pumping plant for the modern

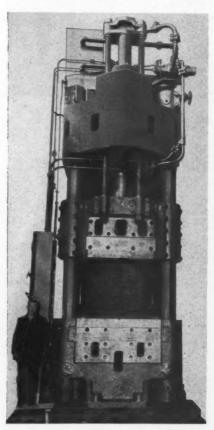


Fig. 17—Hydraulic Metal Forming Press built for blanking and forming duralumin aircraft parts. Moving-down type with self-contained oil power unit mounted on top of the press. 2000 tons capacity, one 38" and two 20" diameter rams, 2300 pounds working pressure, two 10" diameter push-back rams, 60" opening, 36" maximum stroke, platen area 136"x96" with provision for future extension to make platen area 184"x96".

hydraulic metal-forming press consists of a motor driven, high pressure, rotary, radial piston pump,

on –

v. 1937

gham resses.

pment

os and

plants.
ne hycion of
ry but
rs has
r-operquanTrue,
duced
f this

speed has recepperior ork is

anced ection

pings
oly of
ue to
f the
n, re-

ssure es of f the



Fig. 18—The hydraulic pressure for the 2000-ton Metal Forming Press shown in figure 19 is supplied by the radial piston pump mounted on the top of the press and driven by a direct connected 100 H.P., 585 R.P.M. motor. This view of the top of the press also shows the oil tank, piping and valves, and the pushback rams which return the moving platen to its starting position. The operation of the press is controlled from the operator's station where he can watch the work.

using a high grade medium or heavy oil as the hydraulic medium. The pump suction line runs from the oil tank, which also discharges directly through the prefilling valve into the main cylinder. For this reason, as well as to economize on floor space, the pumping unit and oil tank are usually located above the main cylinder, on the top crosshead.

Control is effected by a pilot-operated, four-way hydraulic valve, or a combination of valves operating in sequence, but all actuated by a small pilot-valve which is usually no larger than one's forefinger. In some designs, compressed air is used for operating the valve. The item of control is the principal point of interest today among press designers, and with the rapid growth of the application of hydraulic drives and controls to machine tools, remarkable advances are being made in the art.

Someone has coined the expression "the new hydraulics," and it is very applicable. To illustrate the point, a recent article on hydraulic controls appeared in a technical magazine, in

which the author, a research engineer of note, used the electrical analogy of the Wheatstone Bridge to aid in clarifying his explanation of his patented hydraulic control circuit, which he unbalances by means of a small hydraulic choke-coil. That completes some sort of an industrial cycle, because many will remember that the principle of the Wheatstone Bridge was explained in their day by using the hydraulic analogy. And here we find the use of electrical principle to clarify the complications of the so-called "new hydraulics."



Fig. 19—A 500-ton down-acting type hydrallic metal forming press installed in an a reraft factory. Hydraulic power supplied by radia piston pump mounted on top of the press.



FORGED TOOLS

COMMERCIAL DROP FORGING HAMMERS and DIE MAKING MACHINERS

Manufacture of Aircraft and Electrical Parts

In the manufacture of the all-metal airplane of today, extensive use is made of the hydraulic metal-forming press for forming the numerous duralumin parts that go into modern aircraft. These presses are quite

Fig. 20—Triple capacity hydraulic press for forming and flanging heavy metal parts. Three rams used separately or in combination provide pressures of 500, 1000 or 1500 tons.

special, as the duralumin forming operations are peculiar to the aircraft industry and require a type of press that would be of small use in, for instance, the automobile industry.

There has recently been installed in a California aircraft factory a hydraulic press that is the largest in operation. It is of 2000 tons capacity, under a hydraulic pressure of 2300 lb. per sq. in., exerted on one 38-in. ram and two 20-in. rams.

While the maximum capacity of the press is 2,000 tons, the pump control is of such design that a wide range of hydraulic pressure may be obtained by a simple adjustment of pump controls, thereby varying the

capacity of the press, as expressed in tonnage, in direct proportion to the hydraulic pressure. Provision is also made for using the central 38-in. ram only, giving a capacity of 1,300 tons. Single acting push-back rams raise the moving platen to open position. Push - back cylinders are of the outside type, requiring a minimum of maintenance.

The clear space available between tie rods is 61 in. wide by 97 in. long. The overall dimensions of the bottom crosshead and of the moving platen are 96x133½ in. Both the moving platen and the bottom crosshead are provided with T-slots running the width of the press and with machined surfaces for future addition of platen extensions.

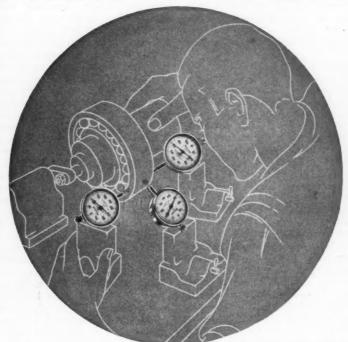
The press is designed with a maximum opening of 60 in. and a maximum stroke of 36 in. Closing speed of the press is 130 in. per minute, with a pressure speed of from 1 to 10 in. per minute.

The traverse, or return speed of the press, is approximately 130 in. per minute.

Control of the movements of the press is effected by a hand controlled operating valve, with provision for "inching" the moving crosshead for die setting or for operations that are peculiar to the forming of dural for aircraft construction. A rotary ra-

STAR

MARRETT DIAL INDICATORS ARRANGED FOR PRODUCTION INSPECTION OF BEARINGS



For PRODUCTION INSPECTION

Starrett Dial Indicators are made in a complete range of standard sizes and dial calibrations or special indicators can be developed to suit your gaging operations. The second edition of the Starrett Dial Indicator Catalog MD just off the press illustrates and describes the entire line of STARRETT and LAST WORD Indicators. Write for a copy.

THE L. S. STARRETT CO., ATHOL, MASS., U.S.A. World's Greatest Toolmakers.—Manufacturers of Hacksaws Unexcelled — Steel Tapes, Standard for Accuracy

Standardize on

TARRETT TO DES

BUY THROUGH YOUR DISTRIBUTOR

on one

, 1937

range obent of the as ex-

direct lraulic s also central a ca-Single

raise open cylintype, m of

ilable
1 in.
The
e botthe
133½
laten

d are nning and for n ex-

with
f 60
ce of
the
nute,

the per

for for are for radial piston pump of 100 gallons per minute capacity, driven by a 100 h.p. motor is used on this press. A total of 16 barrels of heavy oil is used as the hydraulic operating medium.

An aircraft manufacturer in the East has recently installed a 500-ton hydraulic press of similar design, except that only one ram is used. This hydraulic metal-forming press is of the down-acting type with self-contained power unit. Maximum tonnage capacity of this press is 500 tons, under a hydraulic pressure of 2,250 lbs. per sq. in. on a 24-in. ram of 36-in. maximum stroke.

While the maximum capacity of the press is 500 tons, the pump control is of such design that a wide range of hydraulic pressure may be obtained by a simple adjustment of pump controls. Single-acting pushback rams are also used on this press to raise the moving platen to open position. Push-back cylinders are of the outside packed type.

The clear space available between tie rods is 61 in. wide by 90 in. long. The bottom crosshead and of the moving platen is 80x126 in. Both the moving platen and the bottom crosshead are provided with T-slots running the width of the press. The press is designed with a maximum opening of 60 in., with a maximum stroke of 36 in.

Closing speed of the press is 110 in. per minute, with a pressing speed of from 1 to 10 in. per minute. The traverse or return speed of the press is approximately 100 in. per minute. Control of the movements of the press is effected by combination foot and hand controlled operating valve, with provision for "inching" the moving crosshead.

In the factory of one of the large elect. cal manufacturers a 1,500-ton hydraulic press is in operation, flanging and forming metal parts. This

press has a 34-in. diameter main ram and two 18-in. diameter auxiliary The large ram produces a rams. pressure of 1,000 tons, and the smaller rams each provide an additional 250 tons pressure. Thus this press can be used as one of 500 tons capacity, 1,000 tons capacity, or 1,500 tons capacity, or the 500-ton capacity can be used for blank holding and the 1,000-ton capacity for drawing. The press has a 97x85-in. platen, a maximum opening of 72 in. and a stroke of 48 in. The work on which this press is used is all of a heavy nature and quite different from the operations in the aircraft factories.

Perhaps the greatest potential user of the hydraulic press is the automotive industry, due to the fact that, in every phase of this leading industry, successful competition depends largely upon maintaining a constant watch for production economies. At one of the leading automobile plants two 750-ton hydraulic presses may be found turning out 1,200 finished tops in 61/2 hours. These presses are of the triple action type, each being composed of the blank holder, the inner slide, and the bottom punch. These functions may be used separately, if necessary.

While the capacity of such a press is not very high, from the viewpoint of tonnage, the size of the press provides an interesting comparison. The bed is 132 x 96 in. The blank holder daylight is 98 in. and the maximum daylight between the table and the inner slide is 119 in. The stroke of the inner slide is 37 in. and the stroke of the blank holder is 26 in. The weight of the press is 250 tons.

WAS ESCO

This press extends from the base 16 feet below the floor to a height of over 26 feet above the floor—almost four stories in height. The radial piston pump supplies 285 gallons of oil per minute at a maximum pressure of 2500 pounds per square inch.



ram

the ddi-

this ons 500 city and

ing.

ing.

a a

i a

ich

the s. tial the fact

dedea onomoulic

out nese ype, ank bot-

be ress oint oro-

The der um the of

The ase

dial of res-

ich.

The latest developments in presses of this design are of 1,000 tons capacity and are equipped with twin pumps of 285 gallons per minute capacity.

These presses are, to the best of the writer's knowledge, the largest high-speed metal forming presses ever built as to their physical size, but they are exceeded in tonnage capacity by some 2,300 ton capacity must be capable of taking an ingot of a size within the capacity of the press and forging it down to finished size and shape. A number of short forging strokes are necessary while the ingot is hot and is being manipulated between the dies and the steamhydraulic forging press is well adapted to this service.

Perhaps a few words describing the

steam-hydraulic intensifier that furnishes the hydraulic pressure for presses of this type, will be of interest. Primarily it is a directacting steam pump, without valves. The intensifier is single-acting and each stroke produces a single working stroke of the press. The largest forging press in the country is at the Naval Ordnance Plant in Charleston, West Virginia, and is of 15,000 tons capacity. It has three 44-in. press cylinders, that may be used in combination of 1, 2 or 3, depending on the forging pressure required. The press is served by three steam hydraulic intensifiers. 76-in. diameter by 84-

in. stroke, using steam at 200 lbs. per sq. in. This develops a maximum hydraulic pressure of 7,000 lbs. per sq. in.

Hydraulic forging presses are not adaptable to certain classes of die forging work, because of the fact that the dies "dwell" on the forging long enough to chill the metal so that its flow is stopped. With the drop hammer, however, the sharp, quick blow does not cause this as the blow is instantaneous, with practically no "dwell." It would appear that this is another proof of the claims advanced

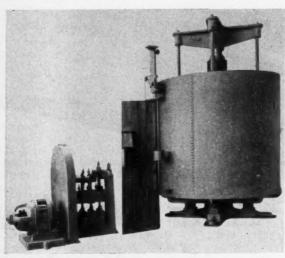


Fig. 21—A hydraulic accumulator plant complete with pump and motor. Note the tank for holding the weight material, also the limit switch and control for starting and stopping the pump motor as limits of travel are reached by the accumulator tank moving up and down with the displacement of the ram.

presses used in the forming of automobile chassis frames. What future developments will be in capacity and dimensions of metal-forming presses is difficult to forecast. The limit of development has not been reached, of course, but whether it will be in speed, control, size or a combination of all three factors is impossible to state.

Forging Presses

The next natural subdivision of hydraulic press application is the forging press. The general requirements of a press of this type are that it

"HAVE HIM COME IN"

Why is it that every day some 2,000 busy executives take time to talk with Socony-Vacuum Representatives?

INDUSTRIAL MEN are busy today. But they welcome real help.

1937

of the nished short while

aniputeam-

well

ing the

intenes the

e for

type, erest.

oump, he in-

e-act-

troke

work-

press.

rging

try is

nance

eston, nd is

acity.

press

ay be

on of

ng on ssure

ess is

team

ifiers,

v 84-

n hy-

per

f die

long t its

hamblow

s in-

y no

nis is

A SOCONY-VACUUM Representative's help is doubly valuable because it is straightforward and cooperative. He knows his side of lubrication. Your own men best understand your individual operating problems and plant conditions.

Last year, Socony-Vacuum engineers were called in on over 25,000 specific industrial lubrication problems. They were consulted by 2,000 makers of new equipment about lubricating systems and methods.

More than likely, right in your own plant are opportunities to reduce costs, lower maintenance expense, improve production results, decrease lubrication bills.



SOCONY-VACUUM

INDUSTRIAL LUBRICATION



SAVES MONEY FOR INDUSTRY

Read what 71 Years' Lubricating Experience...the Greatest in the Oil Business...can do for You. See Next Page.



GARGOYLE INDUSTRIAL LUBRICANTS

ARE FIRST CHOICE OF AMERICAN INDUSTRY

36 of the 50 leading Pulp and Paper Manufacturers.

66% of the leading Iron and Steel Fabricators.

80% of the country's leading Machinery Builders.

62% of the leading Iron Mines, Smelters & Rolling Mills.

81% of the leading Automobile and Truck Manufacturers.

50% of the Steam Turbines rated 5000 KW. and over.

69% of the leading Automotive Accessory Manufacturers.

50% of America's Reciprocating Steam Engines.

74% of the leading Tire and Rubber Manufacturers.

100 Leading Railroads.

65% of the World's Diesel-Driven Ships.



SEND FOR THE SOCONY-VACUUM MAN. Services of trained Socony-Vacuum Engineers are available at all times in helping your men to solve lubrication problems.

SOCONY-VACUUM OIL CO.

INCORPORATED

STANDARD DIE UF NEW TORK DIVISION. WHITE STAR DIVISION: LUBRITE DIVISION: WHITE EAGLE DIVISION WADHAMS DIE COMPANY: MAGMOLIA PETROLEUM COMPANY: GENERAL PETROLEUM CORPORATION OF CALIFORNIA



your



PREPARING FRACTURED METAL FOR WELDING

smoothing welds—snagging and grinding castings—grinding and cutting rivets and studs—grinding metal surfaces when fitting castings—spark-testing steel rods and billets—removing paint, rust and scale—rotary filing—and reclaiming old parts with wire-brush wheel — are some of the cost-cutting uses of Black & Decker Portable Electric Grinders. Three models—4, 5 and 6 inch.

Are you Spending
your Profits

Doing These
JOBS BY HAND?

SMOOTHING AND FINISHING METAL surfaces for painting—removing paint, rust and scale—surfacing tile, stone, etc.—flat surface grinding—smoothing welds and casting ridges—gouging and planing wood beams—rubbing down new lacquer—buffing and polishing metal and other surfaces—are applications where Black & Decker Sanders and Sander accessories save hours of hand work. Four models, for all production and maintenance requirements.



BLACK & DECKER Portable Grinders and Sanders save you money by putting an and to costly hand sanding, filing and buffing—and make quick work of heavy jobs which are slow and awkward to handle on grinding, sanding and buffing machines. Ask your jobber for a demonstration, or write for catalog. The Black & Decker Mfg. Co., 720 Pennsylvania Avenue, Towson, Maryland.

Black & Decker

World's Largest Manufacturer of

PORTABLE ELECTRIC TOOLS

for the superiority of the hydraulic press for cold metal-forming use. But, by the same philosophy, the steam-hydraulic press is ideal for heavy forging and cogging work, as the tremendous sustained pressure exerted penetrates to the very center of the forging and produces a dense, homogeneous steel, less liable to cold shuts and alloy segregation and generally much superior to either rolled or hammered material.

Other Applications of Hydraulic Presses

We have now looked into the use of hydraulic presses in the industries processing plastic materials, and in the forming and forging of metals. There still remains the fourth and last classification covering presses for miscellaneous applications, and utilization of the piston-and-cylinder principle in machinery quite apart from the hydraulic press.

One of the most interesting and impressive hydraulic machines is the hot bloom shear. This shear is used in steel mills for cutting the blooms or slabs as they come from the blooming mill. They have quite a job to do—cutting off blooms that may measure as much as 1,000 sq. in. in cross sectional area, and the capacity required is about 3 tons per sq. in. cross section to be sheared.

These shears are usually operated by the steam-hydraulic intensifier, similar to the large forging presses just described. When the shear knife suddenly goes through the bloom, completing the cut, there is naturally a terrific shock on the shear, particularly on the pull-back cylinder and rods. For this reason, hydraulic pull-back cylinders are seldom used as steam or air cylinders offer greater shock-absorbing capacity.

In the high capacities, the hydraulic shear is the only type given consideration, as the size of shaft and bearing and necessary reduction gearing for mechanical shears makes them prohibitive in weight and floor space requirements.

Hydraulic plate shears are another subdivision of heavy hydraulic equipment, but as the cutting knife is at an angle to the work, and cuts progressively across the plate, means must be provided to equalize the traveling eccentric load thus created.

Hydraulic riveters are a familiar piece of equipment in every large plate, boiler and tank shop although the advance of welding has limited their possibilities. A 200-ton riveter is a comparatively high capacity machine and an operating pressure of around 1,500 lbs. per square inch is usually all that is required. Where riveting has to be done, the work of the hydraulic riveter is superior to that of some other methods, since the sustained pressure on the rivet completely fills the rivet hole.

A menial example of the application of hydraulic pressure is the baling press for baling waste-paper. rags, cotton waste, shoddy and other compressible materials. It is the supreme example of the ruggedness of the cylinder and plunger principle because if ever a piece of machinery is abused by the type of labor employed in plants of this nature, the hydraulic baling press certainly gets its share. An instance can be recalled in New York City where trouble was reported on a baling press pump and the service engineer found the relief valve missing and a coupling in its place. The operator explained that, with the relief valve in the system, "she's no push-em-up fast enough."

But while baling presses are usually found in waste-shops, there is one machine of this type that does not suffer from lack of maintenance. It is in the most publicized automobile plant in the country and its job is to take junked automobiles and to

QEAKAGE 1937 earing them : space nother

You'll See the Difference When You Use the

Weldon Cupped-End Mill

This new mill embodies the following desirable features:

- 1. Stronger, because of scientifically controlled heat treatment.
- 2. Faster, because of improved flute design. Take full advantage of shear-cutting action.
- 3. Costs Less, Let our representative show you why. May we send him?



PIONEERS IN FAST SPIRAL DOUBLE



321 FRANKFORT AVE. CLEVELAND, OHIO

equipe is at ts promeans e traved.

amiliar large though limited riveter ty masure of inch is Where

rior to nce the et comapplica-

vork of

is the -paper, d other the suness of inciple chinery or em-

re, the ly gets recalled ble was mp and e relief

in its d that, system, ugh."

re usuhere is at does enance. utomo

its job and to bale them—if that is the word—into a billet or bloom and dump them on to a conveyor running to a remelting furnace. One car a minute enters this behemoth, is promptly flattened, wheels and all, and is then attacked by two large hydraulic rams worked at right angles to each other. The final compact mass emerges as a bale $72 \times 30 \times 24$ in. and drops onto the conveyor for its trip to the furnace, where it will begin life anew. As this baler is not fussy over its menu, it may be that your new car has some truck-blood running in its veins.

The variations of the hydraulic press are almost without number, and a great many of the applications of the idea, such as the wheel press, arbor press, hydraulic jack, and so on are familiar to all.

G-E Electric Heating Units and Devices. Here, in this 60-page book, are the answers to the hundreds of small heating problems that arise daily in industrial plants. Before General Electric originated and developed the line of small heating units and devices described herein, the installation of a "spot" or "zone" of heat in machinery, processes and isolated buildings was a complicated and expensive job usually necessitating considerable piping and equipment. Often it was necessary to operate an expensive steam boiler during summer months solely to supply heat to processing equipment.

Through this book the General Electric Company offers a complete line of electric units which can be selected, ordered by mail, and installed according to the simple directions given in the book. The user of electric heat will keenly appreciate its cleanliness, convenience, flexibility, accuracy, safety, and economy. No skilled operator is required to operate these devices; they are designed so that by simply touching a button, the units can be precisely and automatically controlled.

The line of equipment described and illustrated in this book is of a wide enough variety to fit almost any conceivable heating requirement. The units have been built to the highest standard of G-E craftsmanship and designed for the utmost convenience of

installation. Copy will be sent free to any mechanical executive or engineer who will address General Electric Company, Schenectady, N. Y., and ask for publication GED-650.

Landis Check Book. This book, now being distributed by Landis Machine Company, Waynesboro, Pa., is in the general form of the well-known check book, each page, however, being devoted to a drawing and description of a threading job. The purpose of the book is to make available to users of thread cutting and tapping equipment reliable costs and production data.

Each page lists the job number, equipment used, name of part, material, hardness, thread form, diameter, pitch length, limits, production per hour, cutting speed, threading cost each, and remarks. The various jobs listed were selected with a view to covering as many different types of threading and tapping jobs as possible. Each check carries a stub with a number corresponding to the job number as listed on the check, thus making it possible for the interested reader to obtain all additional information possible on the individual job by returning the stub to the Landis Machine Company.

Copy of the Landis Check Book free to any mechanical executive upon request.

Atlas Lathe Manual. An entirely new lathe book, the Atlas "Manual of Lathe Operation," released recently by Atlas Press Company, promises to become a permanent reference source for all shop men, both experienced and beginners. Its 272 pages illustrate and describe in easy-to-understand language the latest technical data for machining the new metals and plastics.

The contents and make-up indicate careful planning, extensive study and research—the new metal binding and divisional index tabs are a marked improvement. Chapter Headings: Latte Care and Construction, Theory of Metal Cutting, Cutting Tools, The Machining of Various Materials, Holding the Work. Drilling and Boring, Thread Cutting. Latte Attachments and Their Uses. Woodturning on the Metal Lathe, Machinists Tables, Index, and Pages for Shop Notes.

The Atlas Manual is priced at \$1.00, delivered to any point in United States. For your copy, write Atlas Press Company, 1819 North Pitcher Street, Kalamazoo, Michigan.

the sensation of the drilling field 44,000

without stripping a single thread or breaking a tap...

Several months ago one of the Southwest's leading manufacturers installed a 3-ft. "American" Hole

Wizard. He now informs us that since its installation his Hole Wizard has drilled and tapped 44000 136" holes in Bohnalite Crank Cases without stripping a single thread or breaking a tap.

That's simply typical of Hole Wizard performance. Almost daily we receive enthusiastic reports of excellent results from Hole Wizard users. "American" Hole Wizards have become a sensation in the drilling field.

For greater production at lower cost; for greater range, versatility, ease of handling and accuracy, we invite your most searching investigation of the "American" Hole Wizard—the newest of new radials—Send for Bulletin No. 306.

with the state of the state of

THE AMERICAN TOOL WORKS COMPANY

CINCINNATI, OHIO, U. S. A.

free to

ok, now Machine in the

in the n check devoted thread-ok is to ad cut-reliable, equip-

l, hardpitch, ur, cutand reed were as many nd tapeck carrespondon the for the iditional dividual

ook free pon re-

he Lan-

ely new
of Lathe
y Atlas
come a
all shop
ginners
cribe in
e latest
he new

indicate dy and and diced im-Lathe of Metal achining e Work, Cutting, r Uses, ne, Mages for

t \$1.00, States. s Com-. Rala-

New Spindle Noses and Chucks Represent Advance in Design

American Standard allows chucks and fixtures to interchange on turrel, automatic, and engine lathes. New safety features are included.

BY J. E. LOVELY*

Chairman, Technical Committees on Spindle Noses and Collets and on Chucks and Chuck Jaws of the Sectional Committee on Small Tools and Machine Tool Elements.

THE new American Standard Lathe Spindle Noses and the new American Standard Chucks, recently approved by the American Standards Association, serve a long-felt need in enabling the user to interchange

and chuck manufacturers who have cooperated so splendidly and wholeheartedly during the last eight years with the Sectional Committee on the Standardization of Small Tools and Machine Tool Elements and its tech-

nical committees, in all the processes of the development of this series of spindles and chucks. The large expense incurred during the last eight years by many of these manufacturers and the great amount of time contributed by many of the committee members has borne fruit splendidly and all who have been engaged in this work can be commended generously for the part they have contributed.

These new spindles furnish a more rigid mounting of chucks and fixtures than previously threaded noses, or earlier forms of flanged spindles, and provide a degree of accuracy in alignment and interchangeability previously considered impossible. They overcome the long-recognized objections of the threaded nose, remove the danger of chucks coming loose at high speeds when the spindle brake is ap-



Fig. 1—American Standard chucks in 6-inch, 8-inch, 10-inch, 12-inch and 15-inch sizes.

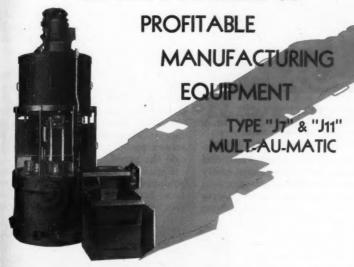
chucks and fixtures on different makes of turret lathes, automatic lathes, and engine lathes. In addition, these new standards represent a great advance in design and performance that will be appreciated by users and builders of lathes alike throughout industry.

A great deal of credit is due the large number of machine-tool builders

*Vice-President and Chief Engineer, Jones and Lamson Machine Co., Springfield, Vt.

FORE THOUGHT

IN THE PURCHASE OF



Forethought in the purchase of manufacturing equipment invariably results in Profitable afterthoughts.

We call your attention to this fact because in the design and construction of Type "J-7" and "J-11" Mult-Au-Matics, Bullard Engineers considered forethought as a Prime requisite for Your Profitable Investment and afterthoughts.

Let us demonstrate how this works when applied to your Jobs. Send blueprints or samples for estimates and cost facts,

Time Saved is Money Earned.

THE BULLARD COMPANY BRIDGEPORT, CONNECTICUT

BULLARD

, 1937

ndard and interurret, d en-

New s are

have whole-years on the ls and stech-

pment es and xpense t eight e man-; reat ributed

mittee fruit have work eroushave

more xtures es, or es, and alignpre-

They objective the thigh is ap-

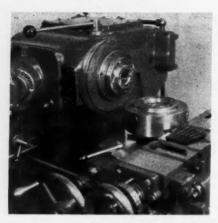


Fig. 2—Turret Lathe equipped with 6-Inch Type Al American Standard Lathe Spindle Nose, showing the mating with a 10-Inch American Standard Chuck.

(Photo courtesy Jones and Lamson Machine Company.)

plied or the spindle is reversed, and they allow chucks to be changed easily and quickly whenever required.

These new American standards were approved by the turret lathe group

and the automatic lathe group of the National Machine Tool Builders' Association about two years ago and are now available on most of the new models of turret lathes and automatic lathes made in this country today. In addition, two of the prominent engine lathe builders are now furnishing all of their engine lathes with these new spindle noses and most of the other engine lathe builders are in a position to furnish them on demand.

The new American Standard chucks are also in production and may be obtained readily from most of the chuck manufacturers or may be secured as regular equipment through any of the ma-

chine tool builders making machines with the new standard spindles.

Fig. 1 shows a group of lathe spindles having respectively a 6 in., 8 in., and 11 in. Type A1 American Standard Lathe Spindle Nose. The complete series comprises two spindle noses smaller than those shown and two larger, the whole series covering a range suitable for the smallest lathes to the largest regularly being manufactured. The largest nose in the series is known as the 20 in. nose, and will accommodate holes up to 15 in. in diameter.

Fig. 2 shows a Turret Lathe equipped with a 6 in. Type A1 American Standard Lathe Spindle Nose and shows the mating 10 in. American Standard chuck. The chuck in this case is attached by socket head cap screws passing through the chuck inside the scroll.

Fig. 3 shows another Turret Lathe equipped with a 6 in. Type D1 American Standard Lathe Spindle Nose, also the mating 10 in. American

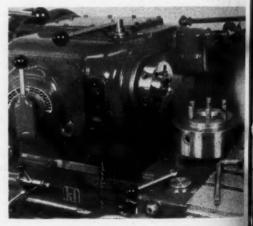


Fig. 3—Turret lathe equipped with 6-inch Type Dl American Standard Lathe Spindle Nose, with mating 16-inch American Standard chuck. This form provides for a quick change of chucks and fixtures. Because taper pilots on both Type Al and Dl spindles are the same diameter, chucks and fixtures may be interchangeable on both types.

(Photo courtesy Jones and Lamson Machine Company.)

, 1937

es.

WORTH



of HIGH

How many 1/2-inch discs can you get out of a bar of steel 20 inches long, 6 inches in diameter?

The answer is thirty-six, if you use a HORIZONTAL-NAPIER Continuous Band Saw Machine. Many reciprocating hack saws give no more than twenty-seven. In today's metal market, the material saved is worth about \$54.00.

You also enjoy an additional saving in labor-time. You get higher blade efficiency and less breakage. You get a smoother cut, and high precision discs.

You will find the HORIZONTAL-NAPIER Continuous Band Saw Machine a thrifty addition to your force.

METAL SAW and MACHINE COMPANY. Incorporated

40 NAPIER STREET . SPRINGFIELD . MASSACHUSETTS

WRITE FOR

pany.)

Please will top a sapy of:
CHART SHOWING CORRECT PITCH AND TEMPER BAND SAW FOR EVERY KIND OF METAL CU
Your Name
NAME OF BUSINESS

MAIL THIS COUPON FOR FREE BOOK OR CHART .-

Standard Chuck. The chuck in this case is the same as the one shown in Fig. 2 except that it is held in position on the spindle nose by means of the six cam lock studs shown projecting from the back of the chuck, which are engaged by the cams provided with square sockets in the flange of the spindle nose. This D1 form of nose provides means for a quick change of chucks and fixtures and is recommended for use where the time required for changing chucks should be kept to the minimum. Both the Type A1 and D1 spindles have the



Fig. 4-American Standard Chucks in 6-inch, 8-inch, 12-inch and 15-inch sizes.

same diameter taper pilots and the same location of the outer bolt circles, so that chucks and fixtures may be made interchangeable on both types.

All of these spindles are provided with a taper pilot and all fixtures and chucks are made to give a tight fit on the pilot when drawn back against the flat face. This feature allows the spindle to be reconditioned at any time should the pilot become worn or the face mutilated, because the original size on the taper pilot may be obtained by grinding back on the face and regrinding the pilot.

Fig. 4 shows a group of the new American Standard Chucks. The chucks illustrated are the 6 in., 8 in., 10 in., 12 in. and 15 in. sizes. The pamphlet referred to below establishes controlling dimensions of all chucks from 6 in. to 36 in. in diameter in both medium-duty and heavy-duty types. Both of these types have master jaws of the tongue and groove

type and dimensions have been established making the top jaws interchangeable. An extra-heavy series of chucks with serrated master jaws has also been established and are described in the same pamphlet. Dimensions have been established for power-operated and hand-operated chucks of the two-jaw, three-jaw, and four-jaw type, the top jaws being interchangeable on power-operated and hand-operated chucks of the same outside diameter.

The new American Standard Chucks may be mounted directly on the Amer-

ican Standard Lathe Spindles without having to be fitted to the individual spindle. The taper pilot and the flat face on the spindle insures chucks and fixtures running true within a fraction of a thousandth of an inch even when transferred

The

in '

act

you

you

bar

Bro

sav

ant

from one machine to another.

The rigid mounting employed enables these new spindles and chucks to be admirably suited for modern high-production service under the high speeds encountered today.

So far these new spindle noses and chucks have been approved and accepted by the American Standards Association for turret lathes and automatic lathes only, but the Setional Committee on the Standardization of Small Tools and Machine Tool Elements, as well as its technical committees connected with this development, feel that they are equally adapted to engine lathes and hope that their use will finally become universally extended to engine lathes by all the prominent builders of these machines.

These spindles may be used equally as well on the work spindles of grinding machines, as well as many types of special machines. estabintereries of ws has scribed ensions

1937

wer-op icks of our-jaw changeand-opoutside

Chucks Amer-Lathe at havto the le. The the flat ndle in-

nd fixg true on of a an inch asferred

yed enchucks modern the high

ses and and acandards es and he Secdardiza-

cal comdevelop equally ad hope me uni thes by

of these equally f grindy types





Write for a copy of Bulletin 370

anteeing a 100% usable product.

JOHNSON BRONZE

590 S. MILL STREET · NEW CASTLE, PA.

eeve bearing headquarters

104

Dimensions, specifications, and working tolerances of these new American Standard Lathe Spindle Noses are given in the American Standard Lathe Spindle Noses for Turret Lathes and Automatic Lathes (B5.9-1936) now available. The new chucks referred to are described in the American Standard Chucks and Chuck Jaws for Turret Lathes and Automatic Lathes (B5.8-1936). Both of these pamphlets may be obtained through the American Standards Association. Copies of the standards on chucks and chuck jaws are 45 cents; copies of the standards on lathe spindle noses are 50 cents.

Members of the ASA are entitled to 20 per cent discount when ordering American Standards through the ASA office.

"Prevention of Heat Sickness." The successful application of research to an old industrial problem is outlined in a

32-page book which is now being distributed by Fairway Laboratories, Inc. Belleville, Ill. "Heat sickness" has come to be recognized as an important problem in steel mills, heat treating plants, and other plants and departments which depend upon high temperatures for processing. The problem has baffled medical science for many years. Industrially, heat sickness has the most disastrous effect on both individual and group production due to the afficted workman having to instantly surrender whatever mechanical process, tool or material with which he is engaged at the moment. Inasmuch as orderly shop procedure is one of the requirements of modern industry, the disastrous effect of having a workman quit at a most unexpected moment is obvious.

It has come to be generally known that the cramps, nausea, dizziness and general muscular exhaustion which accompany "heat sickness" are due to the sweating of an excess of salt from the muscular tissues. A simple means of replacing this salt loss by means of tablets which can be made available to the workman through wall dispensers is discussed in this book. Copy free to any mechanical executive.

NEW

U. S. No. 1 Anti-Friction Bearing

Hand Milling Machine

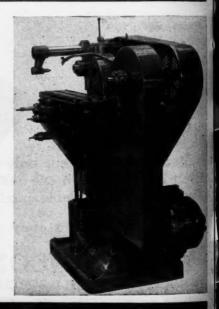
The New U. S. Hand Miller is particularly adapted to high speed light milling operations. Vertical and horizontal feeds.

Improvements: Heat treated chrome nickel steel spindle, Timken bearings, Ballbearing countershaft, V-belt drives, 6 Spindle Speeds up to 1592 R.P.M., providing efficient use of small end mills.

Write for full details.

The UNITED STATES MACHINE TOOL Co.

1954 W. 6th St., Cincinnati, Ohio

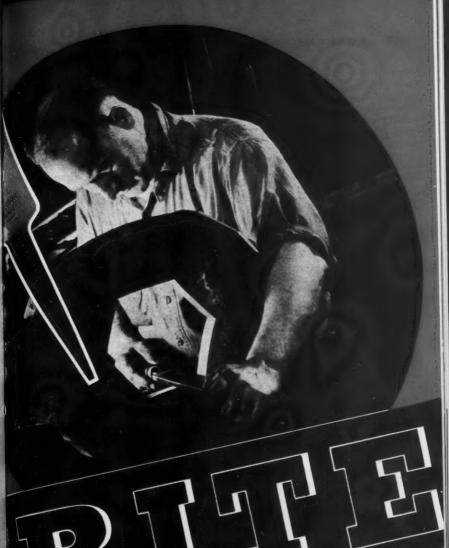


1937

dis-Inc. come prob-lants, which for affled ndus-

disand and ender ol or ed at shop ats of effect most

cnown s and h acto the ns of ns of ispen-Copy



DISSTON RESEARCH AND CONTROL

For Samples Write your Distributor of Disston BITE-RITE Files .

und com

ing ter the

chir

eve chir

pro

it i

is I

rest

bre

lock

off

erec

A

mai gro

goe

and

p00 and

tha

con

the ally

wer

fina

spr

wit

and

I

suc

to t

Thi

con

lon

joir

san

spr

the

teri

V

Was

pla

A Discussion of

Reactive or Spring Washers

BY H. H. TALBOYS

Mgr. Railway Equipment Dept., Nordberg Manfg. Co., Milwaukee, Wis.

T IS with much interest that we, in the Railway Equipment Department of our company, note the advertising of the Spring Washer Manufacturers' Assn. relative to "spring" washers. In our department, we have always referred to the latter as "reactive" washers. The machines we build are light in weight, of necessity, as they are intended to work on railway track and have to be removed

quickly by the men available in order to clear the way for passing trains. This means that the various tools get lots of abuse, stresses and strains are set up between the members, and - if the bolts are not continuously tight breakage is high. In other words, we must keep all parts of the machines tightly bolted together. The bolts themselves are subjected to unusual stresses which strain them beyond their elastic limit. Also, looseness results from the breaking away of paint or scale

under the bolt head and under the seat of the nut.

We have many bolt applications where very short bolts are used to fasten structural members together and, - to maintain tightness, - we wanted such bolts to have an elasticity equal to that of a long bolt, in order to take up for these minor shrinkages of the parts that are bolted together. The method we

finally arrived at to get the heaviest spring washers available. with the idea of using, at each point, a spring washer that would have a reactive pressure equivalent to the elastic limit of the bolt. We issued specifications for spring washers, calling for the heaviest type washers commercially available, and ordered that all thin lock washers be discarded.

We came to the conclusion that, if a bolt should become loose due to stretch or because of wear under the



nder the

olications

used to

together

s, - we

bolt, in

e minor

hat are

hod we

rived at

get the

pring

vailable.

idea of

t each

pring

t would

reactive

equiva-

elastic

speci-

calling

neaviest

rs com-

a vail-

ordered

in lock

be dis-

to the

that, if

ald be-

due to

ecause

ler the

head of the bolt and the seat of the nut, it would be better if the nut, under such circumstances, would become loose and drop off. If the holding power of a bolt were lost due to the above causes, it would be better that the nut dropped off so that the operator or caretaker of the machine would readily discover it, for

every bolt put into a machine is put there to do its proper share of work, and if it is not doing it, extra load is put on the adjacent bolts, resulting in trouble and breakage. With the nut not locked on the bolt, it will fall off and be readily discovered.

Another machine that we manufacture is an underground tunnel shovel. This goes into mines and tunnels and, due to conditions of poor light, inaccessibility, and the lack of attention that underground machines usually get, we experienced considerable breakage due to the machine getting generally loose wherever the parts were bolted together. We finally decided to put heavy

spring washers wherever possible, with the result that we cut breakages and repair costs just about in half.

It is common practice, in designing such things as cylinder head studs, to use as long a stud as possible so as to get greater elasticity in the stud. This keeps the heads tight. It is a common principle of design that longer studs will maintain a tight joint better than short studs. This same effect can be attained by using spring or reactive washers, because they have the same physical characteristics as long studs or bolts.

We had a case where a %-in. bolt was holding two 3-in. angles to a plate, each of the members being 4-in. thick. These members were subject to continual shock and it was impossible under such conditions to keep the bolts tight. This looseness resulted in annoyance and breakage. It was suggested by one of our field men that we put the heaviest reactive washer obtainable under the seat of the nut on this short bolt. The re-



Nordberg-Butler Crawler Shovel, in which many spring washers are used.

sult was that we eliminated all looseness and trouble, thus preventing damage not only to the affected parts but to the adjacent ones.

We have, on our tie adzing machine, heavy cutter heads which revolve at high speed, and which must be changed every 20 to 30 minutes. If they should become loose and fly off they would be very dangerous to the workmen because of their weight. At the same time, it is necessary that the cutter heads be held on by one center bolt, and that they can be quickly removed by means of one nut. We solved this problem by using a heavy reactive washer under the nut and in all of the tens of thousands

of times these heads have been put on and taken off we have never had an instance of them becoming loose.

Another instance in which the reactive washer has solved a troublesome point, is on one of our machines where a heavy part is fastened to a shaft by a tapered fit and where the driven part was subject to terrific We had continuous trouble with the hub loosening and with galling of the shaft. We solved this by putting on a heavy reactive washer which kept a constant pressure pushing the tapered hub onto the tapered shaft and, even though there was a slight enlargement of the hub, the reactive spring kept pushing the hub farther and farther on the tapered shaft, thus maintaining a tight fit.

Our experiences have taught us that practically any problem of looseness can be solved by using a heavier compensating device, and that spring washers—because of their greater range of action—give satisfactory results.

Logan Hydraulic Operated Devices Bulletin AH-32. This bulletin, now being issued by Logansport Machine, Inc., Logansport, Ind., is actually a 12-page catalog describing the electric-hydraulic power devices in both the accumulator and non-accumulator types, hydraulic double acting cylinders, hydraulic operated chucks, and hydraulic presses made by this firm. All the various types and sizes of equipment are illustrated. Copy free upon request.

Themac Grinders, product of The McGonegal Manufacturing Company, 228 Orchard St., East Rutherford, N. J., are presented in a loose leaf catalog which is now being distributed by this firm. Included in the text are descriptions of the portable electric grinder which is designed for application to lathes or other machine tools and the Themac flexible shaft tool, which is designed for suspension from a wall bracket or an overhead trolley. The construction features are illustrated by cross-section drawings and complete specifications are included. Copy free upon request.



Courtesy of
The Carlton Machine
Tool Company Courtesy of The Charles G. Allen Cincinnati, Obio Company Barre, Mass.

Cutting Oil, drills produce round, smooth and straight ITH the aid of Sunoco Emulsifying

In addition, more holes are produced per drill grind; holes of exact size.

Drill breakage is minimized. Further, Sunoco washes away the chips, and drills do not clog, bind, chatter and the drills cut cleaner and faster.

per machine unit, closer tolerances; and that it also helps to lessen tool costs in the drilling operations. show what Sunoco can do-and prove that this widelyknown cutting lubricant helps give greater production Mere claims? Far from it. Actual performance records



SUN OIL COMPANY, PHILADELPHIA, PA., U.S.A.

Sun Oil Co., Ltd., Montreal, Toronto • British Sun Oil Co., London, Eng. Subsidiary Companies:

ow bee, Inc.,
12-page
draulic
nulator
draulic
ic conperated
ade by
es and
I. Copy

he Mcly, 228
J., are
which
s firm.
ions of
nich is
hes or
rhemac
ned for
or an
on feasection
ons are

tes sts ut les e savise e rison, e crion e Ryersel vs many

Your Insurance Program "Boiled Down"

Insurance has become an important item in plant management.

This article presents a concise method of analyzing and recording a complete insurance program for a manufacturing plant.

BY W. F. SALWAY

THE following set of forms is used by an Insurance Manager who handles industrial insurance of every kind for, and on behalf of, the business owner. The system is patterned after that used by the insurance departments of large corporations. It affords a complete record

and analysis of insurance for the large as well as the small business firm. The adoption of the methods suggested by the forms will be found in most cases to result in material savings in insurance costs.

A copy of the "Annual Cost Record", Form 1, is shown below. How

INSURANCE MANAGEMENT

ANNUAL COST RECORD

Class of Insurance	Amount of Insurance	Premium Cost 19	Amount of Insurance	Premium Cost	Amount of Insurance	Premium Cos
Fire						
Tornado						
Rent						
Use and Occupency						
Sprinkler Leakage						
Riot						
Explosion						
Automobile Liability						
Automobile Fire and Theft						
Automobile Contingent						
Public Liability						
Group						
Fidelity Bonds						
Boiler						
Workmen's Compensation						
Work. Comp. Medical, Etc.						

y, 1937

or the

Isiness

ethods

found

aterial

t Rec-

How



The hand that writes your power drive specifications also writes, for better or for worse, the performance of your machinery and plant equipment. More is at stake than the choice of any particular drive, because losses in machine production and efficiency can be traced in many cases directly to the drive between the motor and the machine.

ecifications

Why are Whitney Chain Drives the choice of so many leading machinery builders? Because they give maximum power to the machine with minimum frictional losses and because they do not depend upon excess belt tension and bearing loads to give efficient operation. In other words, they allow the full machine capacity to be realized.

Another interesting fact about Whitney Chain Drives is their economy. Due to the generous use of heat treated alloy steels and precision manufacturing methods, Whitney Chains stand up under the most severe operating conditions, and pay their cost many times over in freedom from breakdown and production losses.

Write today for further information on the Whitney line which includes Roller Chain. Silent Chain, and Flexible Couplings. Our engineers are always ready to make recommendations. The Whitney Chain & Mfg. Co. Dept. B-2, Hartford, Connecticut.

Y CHAIN DRIVES

INSURANCE MANAGEMENT

POLICY RECORD AND ANNUAL COST

incep- tion Date	Insurance Company	Policy Number	Premium	Expiration Date	Term of Months	Class of Risk	Agent	Date Cencelled	Amount Cancelled	Premium Returned	Annual Cost	Umarine Premium
							7					

Form 2-Policy Record and Annual Cost

many plant owners can tell you the total annual cost of all their insurance? You will note that the sheet affords an opportunity to list every class of insurance in force together with the amount of coverage and its cost. The total cost for the year is used to compare with the cost of each succeeding year.

The form indicated as No. 2 com-

bines a "Policy Record" or "Expiration Sheet" with a "Cost Record". When the policy on line one expires, draw a line through the record and enter it at the bottom of the sheet. If a policy, or portion of a policy, is cancelled, deduct the amount "Premium Returned" and enter the difference in the column "Net Annual Cost". "Unexpired Premiums" col-

INSURANCE MANAGEMENT

Risk Number

WORKMEN'S COMPENSATION
THE INDUSTRIAL COMMISSION OF OHIO

	Manual Numbers	Classification	1936 Rate After Penalty or Credit	Rate After Penalty or Credit
				De
-		Cost Record		Amount Spent
	Paid for Period			
	First Period			
	Second Period			
	Cost of Medical Examination	n of Employees		
	Cost of Safety Campaign			
-		The Industrial Commission of Ohio		
	Date	Actuarial Department		Amount Spent
	Compensation Paid to Injure	d Employees		
	Medical Costs Paid			
	Outstanding Estimates			30
	Normal Losses			
	Excess Losses			
				38

Form 3-Cost Analysis of Workmon's Compensation

ly, 1937 rd and

S(0)SILENT GEARS

NSUROK Gears have conclusively demonstrated their matchless high quality in thousands of installations where unusually destructive conditions of wear, friction, neglect and lack of lubrication were encountered. Outwearing metal many times over, and sharply reducing operating costs, INSUROK Gears are being used in increasingly greater numbers for all industrial requirements.

This wide acceptance of INSUROK offers a profitable opportunity to commercial gear cutters. Full details may be had on request.

The RICHARDSON COMPANY

Expiraecord". xpires.

sheet licy, is Premdiffer-Annual " col-

Lockland, (Cincinnati) Ohio Indianapolis, Ind.

Melrose Park, (Chicago) III. Founded 1858 Lockland, (Cinc New Brunswick, N. J. Indiana Detroit Office: 4-252 G. M. Building, Phone Madison 9386 New York Office: 75 West Street, Phone Whitehall 4-4487

umn may be used for auditing purposes at the end of the fiscal year.

Form No. 3 is used to analyze the cost of Workmens' Compensation insurance. In the case of manufactur-

ployees responsible for Safety Work. It is their joint responsibility to see that total payments of Compensation, Medical and Outstanding Estimates, shall not exceed Normal Losses. Only

INSURANCE MANAGEMENT

LOSS RECORD
WORKMEN'S COMPENSATION

	Miscellaneou	s Losses				
Description	Date of Acci				* ,	Cost of Accident
				1		
lame of Injured Employee	Accident	Case Number	Compensation Paid		Medical Cost	Gr. To

Form 4-Loss Record

ing or contracting firms, the cost of Workmen's Compensation is usually larger than the cost of any other class of insurance.

(a) The business owner should strive to maintain credits to be deducted from the basic rates of the principal "Classifications".

(b) Enter in the "Cost Record" the actual premiums paid. The cost of Medical and Safety Work is a most important part of any insurance program.

(c) Secure the actuarial details of payments made for your account. Bear in mind that an Outstanding Estimate for a serious accident, which may mean prolonged payments, is charged at once to your account as though it had been paid.

Make one physician responsible for medical costs, and one of your emin this way can you hope to secure credits to apply against basic rates.

Form No. 4 is a "Loss Record" divided into two parts. After the Workmens' Compensation risk has been analyzed it is important to keep a record of individual accident cases so that you may determine whether your losses are larger or smaller than "Normal".

A study of "Miscellaneous Losses" over a period of years will enable the business owner to compare "Premiums Paid" to "Losses Incurred". A study of types of accidents will indicate progress made not only in the physical aspects of the plant, but also in the personnel of the firm.

(Mr. Salway will be glad to answer any questions regarding the use of the forms shown here. He can be reached at 215 Loraine Avenue, Cincianati, Ohie.)

Work

y, 1937

to see nsation. imates.

s. Only

Grand Total

secure rates. d" dir the

k has keep cases hether r than

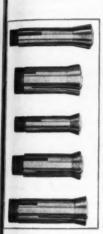
osses" enable Prem-22 A indin the t also

er any at 228

COLLETS

IMMEDIATE SHIPMENT FROM STOCK -ASK FOR BULLETIN No. 36A

ALL SIZES





ALL TYPES



THE ABOVE COLLET DATA BULLETIN IS AVAILABLE FOR PRODUCTION, PURCHASING, STOCKROOM AND ENGINEERING **DEPARTMENTS**

Reasons Why Each Department Should Have a Copy:

- 1. Clearly shows the styles of collets adapted in your lathes and millers.
- 2. Lists the standard collets with general dimensions for identification.
- 3. Gives normal round, hexagon and square capacity of standard collets.
- 4. Shows how all of your lathes and millers may be adapted for collets. 5. Collet stocks in Elmira, Chicago, Detroit, New York and Los Angeles.
- 6. Attractive prices are listed for round, hexagon and square hole sizes.

IARDINGE BROTHERS, INC., ELMIRA, N. Y.

SPECIFY HARDINGE COLLETS

122

Ideas from Readers

This department is a clearing house for ideas . . . If there is a "kink" or short cut in use in your shop, send in a description of it . . . Each one published will be paid for,

Cutting Large-Diameter Plates at Low Cost

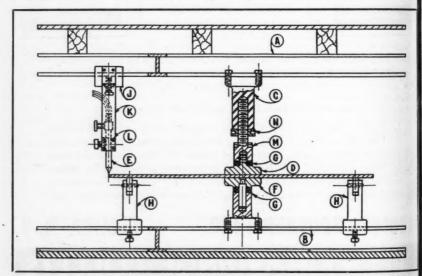
By JOHN A. HONEGGER

THE trepanning tool provides an efficient method of cutting disks of various diameters from metal sheets, providing the diameters are within the capacity of the machine equipment. But when such diameters are greater than the capacity of the machine, the problem of producing a disk may become expensive unless the job is properly handled. Such a situation arose in a steel fabricating shop when it was found necessary to produce a number of sheet steel disks varying in diameter from 4 to 10 feet.

The method that was finally adopted is described here.

Two I-beams, indicated in the drawing as A and B, were attached one to the ceiling and the other to the floor of the shop so that they would parallel each other. To the upper I-beam, A, was bolted what might be termed an inverted jackscrew, C. To the jackscrew was attached a hall bearing mounted flange head D, which was made exactly 6 inches in diameter so that measurements could be made from its periphery to the center of the portable flame cutting torch E.

Directly under the flange head I was located another flange head I supported on a pedestal as shown



Cross section drawing illustrating method of cutting large sheet steel disks.

hort cut in

e paid for.

ly adopted

d in the

e attached

ther to the hey would e upper I. might be ew, C. To

ed a ball

D, which

n diameter l be made center o orch E.

head F as shown

7777

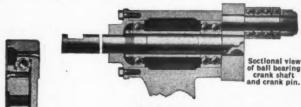
m

wouldn't drive an automobile wagon wheels. with plain bearings? run

MODERN SPEEDS have gone beyond "wagon wheels" and modern production methods have obsoleted plain bearing sawing machines. The "wheels" of the new MARVEL High Speed Hack Saws operate on frictionless bearings. "chassis" has been balanced and weighted to eliminate vibration-like the modern automobile these new type saws have new top speeds and can maintain them continuously hour after hour and day after day.



Even the blade frame travels on balls. Section of blade frame with complete plate removed and e head D urtical section of same.



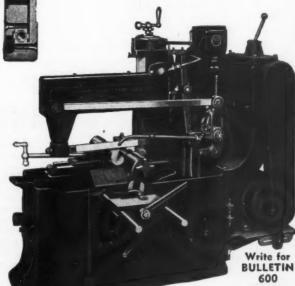
MARVEL

High Speed **Ball Bearing**

Sawing Machines

-Capacity 6" x 6". No. 6A-Same with automatic bar push up.

No. 9-Capacity 10" x 10". No. 9A-Same with automatic bar push up.



ARMSTRONG-BLUM MFG. CO. 345 N. Francisco Ave. Chicago, U. S. A. "The Hack Saw People"

124

Mounted on the lower I-beam were two pedestals H, each carrying a roller and machined so that it could be adjusted as required on the beam. A screw in the bottom of each pedestal provided means for anchoring in position.

On the upper I-beam another adjustable block, J, was mounted, from which were suspended two metal straps K. Between the straps, at the lower end, was fastened the flame cutting torch holder L, carrying the torch E previously referred to.

In operation, the block J was adjusted on the upper beam until the center of the torch tip was at a distance from the flange D equal to the radius desired minus 3 inches which represented the radius of the flange. The roller supports H were next adjusted so that the work was supported inside the circle thus set up. The sheet was then located in position so that it was exactly central with the

flange. To insure quick setting, a 6-inch circle was inscribed in the center of the sheet and this circle was centered with the flange. A bar was then inserted in the hole M and the screw was forced down tightly against the sheet, locking it in position.

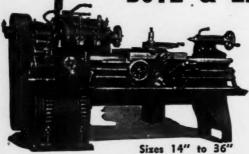
With the workpiece thus located, the torch was ignited and adjusted for the proper type of flame and the cutting operation proceeded. The sheet was fed around by hand until the cut was completed.

Calibrating Compression Springs

BY C. F. FITZ

THE majority of general jobbing and experimental shops have no means for testing or measuring compression springs, and it is for such shops that the device illustrated here is intended. When a designer indi-

ALWAYS A STEP AHEAD with a BOYE & EMMES LATHE



Frequent complete redesigning enables our engineers to incorporate into BOYE & EMMES Lathes every worthy new improvement and many original and exclusive developments in lathe construction. BOYE & EMMES Lathes are modern in every respect.

Write for facts on MODERN BOYE & EMMES Lathes.

THE BOYE & EMMES MACHINE TOOL CO.

"The Lathe With The Longer Life"



ay, 1937

ting, a 6he center was cenbar was and the y against ition.

located, adjusted and the The and until

ssion

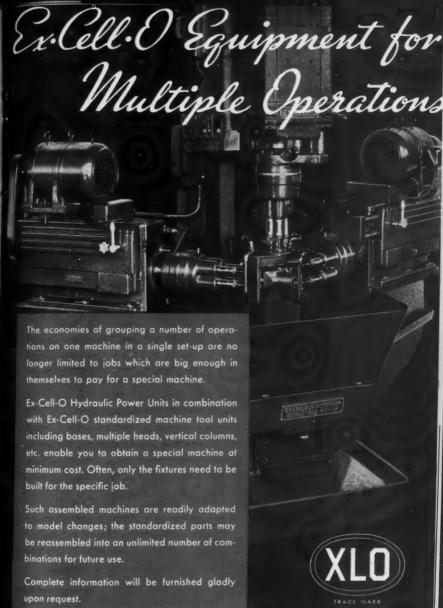
jobbing have no ing comfor such ted here ner indi-

redeengi-

into athes roveginal nents

tion. athes re-

ERN



Drill Jig Bushings Grinding Spindles

Counterbores & Broaches Carbide Tool Grinders

Precision Boring Machines Precision Thread Grinders

Hydraulic Power Units XLO Carbalay Tipped Tools EX-CELL-O CORPORATION, DETROIT, MICHIGAN Please send literature on Ex-Cell-O Products as indicate

NAME

POSITION_

CITY

STATE



CLEEREMAN DRILLING MACHINES

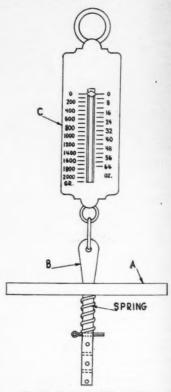
 Sliding Head or Stationary—Round or Square Columns — Fully Geared — Anti Friction — Finest Automatic Oiling — The Newest Drilling Machine On The Market And The Outgrowth of More Than 20 Years' Experience In Building Drilling Machinery.

> WRITE FOR BULLETINS 101 and 102

HE CLEEREMAN MACHINE TOOL CO.

cates a spring, he usually either makes a guess at the size and strength of the spring required or figures the size from a formula, and it has been our experience that in either case the results are not very accurate.

The drawings usually show the



Simple form of spring tester.

length and inside and outside diameters, and it is then up to the mechanic in the shop to produce the necessary spring by trial and error. The mechanic seldom has any equipment for measuring the amount of pressure of the spring at a given amount of compression, and this is the most important factor in the making and use

either ize and aired or ula, and that in ot very

ly, 1937

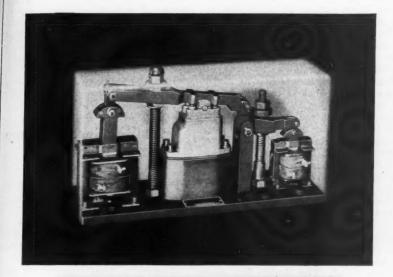
ow the

iam-

menec-The

nent sure t of

imuse



ROSS Operating Valves

Model 4-P 2-SM-Solenoid Controlled

For the control of single and double acting cylinders. This type has no neutral position—locks in either position through MOMENTARY ENERGIZING OF SOLENOIDS.

Other models for hand, foot or mechanical control. All are poppet type—valve seats seal positively—no lapping or grinding required.

ROSS OPERATING VALVE COMPANY

6488 EPWORTH BLVD.

DETROIT, MICHIGAN

of the spring. The simple device shown here makes it impossible to eliminate guesswork.

The measurement is obtained with an ordinary spring scale of the type that is available everywhere. Attached to the scale is a piece of 44-inch drill rod, B, which is flattened at one end so that it can be drilled for the connection to the scale. The other end of the rod is drilled at regular intervals for a cotter pin, which is used to retain the spring in place while the test is being made. The rod is inserted through a $\frac{1}{16}$ -inch hole in a piece of $\frac{1}{2}$ x 1-inch flat cold rolled steel, one end of which is gripped in a vise.

The spring is tested by compressing it to the desired length and measuring from the under side of the bar to the pin which is holding the spring on the rod, the reading being taken at this point. The device has been used extensively by the diemakers in

our plant to obtain springs of the same size and compression for use in compound dies and strippers. All springs are now tested before assembling to the dies, which is much more efficient than the old method of assembling the dies and then discovering that they would not function properly because of one weak or extra strong spring in the set.

Installing Suction Pump Piping

BY W. F. SCHAPHORST

THE drawing shows an important detail that should be borne in mind when installing any kind of pump. Or, in the event that your pump is giving trouble, incorrect ping installation details such as shown here may be the reason why.

Usually a small amount of air is present in all water, hence if any



129

of the or use in S. All fore asis much ethod of discovfunction or ex-

ay, 1937

ımp

portant orne in aind of t your ect pipshown

air is if any

G

ty

COLD DRAWN STEELS DRILL RODS





New...And Devoted to Finer

DRILL RODS **COLD DRAWN STEELS** SPECIAL SHAPES

HIS correct, convenient manual — pocket size — gives ready answers to everyday questions on:

Standard Drill Rod Lists . . . Carbon and High Speed Decimal Equivalents . . . Areas . . . Weights Hardness Conversion . . . Tensiles

Wire Gage Comparison

S A E Chemical Compositions

Temperature Conversion Factors

Recommended Practices on the Heat Treatment of Tool Steels **Definitions of Steel Terms**

. . . also contains life-size portraits of interesting Special Shapes

A copy is reserved for you if you use Drill Rods or Cold Drawn Steels—particularly Cold Drawn Tool or Alloy Steels. or Special Shapes. Write for Catalog No. 3 . . . on your Company letterhead.

PITTSBURGH TOOL STEEL WIRE CO.

MONACA

PENNSYLVANIA



loy, 1

B-E

Bes grow 400

"Ver cutt piec 140

The que

Here's What the NORTON BE" CENTERLESS WHEEL is Doing.

Best wheel we ever had ground 12,000 cranks against 4000 for previous wheel." "Longer life, cocler cutting action - will adopt as standard."

"Best wheel ever tried for cutting and life -150 hours against less than 100 for competing wheel."

"on hardest job (valve steel)
ground 15 feet per minute against
12 for previous wheel - 50 to 75
bars per dressing against 25."

Very satisfactory for life and cutting action. Ground 250,000 pieces compared to 190,000 and 140,000 for competing wheels."

"Best wheel ever used faster cutting and longer life - also increased hourly production."

These are typical quotations from trial reports. It will pay you to try the new Norton "B-E" Centerless Wheel too.

NORTON COMPANY - WORCESTER, MASS.

NORTON ABRASIVES

Hay,

g if o h

point in the suction piping (from well to pump) is higher than the level of the pump, the air will automatically separate from the water and will form

Drawing illustrating correct method of installing piping.

Drawing illustrating the correct method of installing piping.

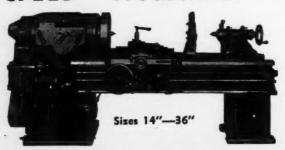
a pocket in the high point of the line. The air will gradually collect there until it reaches such a volume that it merely compresses and expands with the piston strokes. There will then, of course, be no flow of water. The sketch shows the

shows the proper method of piping Note that the suction line should be laid with a gradual slope from the pump to the water supply. The slope of the pipe should be at least 1 inch to each 15 feet.

Just above the proper piping method the wrong way is indicated by means of lighter lines. If suction piping is installed in this manner the air will collect along the top of the horizontal pipe as shown. If, for any reason it is necessary to use such a method of piping, be sure to use a tee and plug instead of the first elbow. The accumulated air then can be released when necessary. Also, above the proper piping method, another wrong method is shown. Notice that the elements of the strength of the proper piping method, another wrong method is shown. Notice that the

SIDNEY

SPEED - ACCURACY - SIMPLICITY



 Step up production with 12-speed sliding gear-head lathes. Outstanding fatures:

12 speeds through sput tooth gears. Automate lubrication in headsted, apron, carriage cress slide, and carriage barings on the bed ways. Anti - friction bearisp throughout.

Write for complete details.

"Lathes and Milling Machines"
THE SIDNEY MACHINE TOOL CO.

937

roper

e suculd be

grad.

m the

slope

should inch

eet.

nethod

ing !

r wil

rizon

eason

nethode e and The

lease

e th

the el-

TY

bearrays. earings

ete

0.

STRONG-ARM JOE SAYS:



FREE!

BLOCK-BUSTER PROVER SET



Put your champ screw buster on this Mac-its free test set. He'll show you how to cut production costs.

• You want to know what screws have to do with back orders? I'll tell you!

When your setups stay set, when you sock 'em down on the toughest jobs and they stay socked . . . boy, you get PRODUCTION!

I thought I knew all about screws, but Mac-its have just got out a new kind of catalog that's a real shop handbook if I ever saw one. Right now we're highballing every order that comes in . . . and, believe me, Mac-its sure are helping us eat up those production schedules!



The Strong, Carlisle & Hammond Co. 1392 West Third St., Cleveland, Ohio.

Kindly send me without obligation, the new Mac-its catalog test set advise nearest distributor (Please Print)

Name..... Title.....

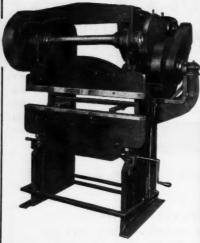
Street

ity...... State.

MS

CHICAGO STEEL PRESS

No. 253



Does 40% to 60% of the forming work turned out by the average shop.

Here's a profitable, economical brake ideally adapted for rapidly forming metal sections such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, and a great variety of sheet metal specialties. Its variable speed drive operates from 17 to 50 strokes per minute. The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials.

Sizes 4, 5 and 6 ft. capacities, up to 10 gauge.

Write for Circular No. 253

DREIS & KRUMP MFG. COMPANY

7418 LOOMIS BLVD. CHICAGO ILLINOIS bow leading to the well is slightly higher than the pump cylinder. Notice how the air collects at that high point.

Careful attention to this diagram while installing suction piping will save time and trouble. The suction line must be air-tight. Special care must be taken to lead or paint all joints to guard against leaks. If the suction line leaks, the pump will not

An "almost horizontal" suction line is practical up to 1,000 feet, but great care must be taken to gradually slope it from the pump to the well. The longer the suction line, the greater the strain on the suction valves in the pump. On suction lines over 100 feet in length it is essential to use an extra vacuum chamber to relieve the suction valves and also to guard against water hammer.

Ouick-Acting Work Support

BY CHAS. H. WILLEY

HERE are certain types of jobs such as the making and tempering of small tools and parts, when a need arises for a work support other than a vise. When tempering is be done with a blow torch, room mus be available for the torch, and pro vision must be made for fire bricks to receive the brunt of the blast at also to reflect the heat so as to pro Such vide an even atmosphere. support is illustrated herewith.



RIVETING MACHINES Assure Peak Production
Lower Maintenance, Rigid
Powerful, Bench and Fi
Types. Motor or Belt for
There is a Linley machine

Types. Motor of There is a Lin every riveting job.

Send Samples of your We and we will furnish accordestimate of production a estimate of production quote cost of equipment.

LINLEY BROTHERS 583 Fairfield Avenue Bridgeport, Conn., U. S.

ightly Not high

agram g wil

uction

int all If the ill not

on lin

greaty slope

greate

in the

00 fee

eve th

guard

ppor

of job

d ter

, whe

t oth

g is

m mu

nd pro

st a

Such

"Lowest Cost per Piece Polished" Depends on

4 IMPORTANT FACTORS

- 1. Correct Grain Size
- 2. Correct
 Grain Shape
- Grain Strength
- 4. Correct
 Grain Surface

Alundum Abrasive is correct in all four factors. Scientific research has determined what they are; modern manufacturing processes and equipment assure their uniform production.

No matter what your polishing jobs may be—fine finishing or heavy duty roughing—you can be sure that Alundum Abrasive will give you lowest polishing costs per piece.

NORTON COMPANY

WORCESTER, MASS.

G45

NORTON ABRASIVES

The support grips the work in the same manner as a pair of tongs. One of the jaws, however, is attached to

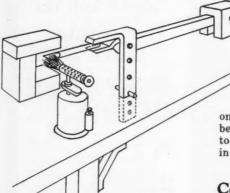
which extends perpendicularly to provide means for opening and closing the jaws. This arm carries an ad-

justable weight for holding the jaw closed, as shown.

The vertical section has several holes which are spaced so that the tool can be adjusted for height, the weight being supported on a pin inserted through

one of the holes and resting on the bench. The tool is simple and easy to make, and will be found invaluable

in many cases.



work support of simple but efficient design.

a perpendicular section that is inserted through a slot in the bench and the other jaw is attached to an arm

Colloidal Graphite Prevents Seizing of Threads

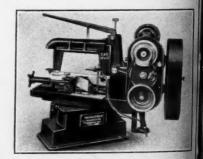
BY BERNARD H. PORTER

ECENT investigations indicate H that vibration, temperature, and

THE NEWEST DEVELOPMENT IN METAL SAWING MACHINES

CAPACITY: 10" x 10"

Swivels on base for angular cuts—three speeds by V-belt—saw guide of parallel type—saw frame has 4 large, self-alignina shoes, unaffected by excessive tightening of saw blade-vise graduated to 45°—feed is compensating type.



Also built as FULL AUTOMATIC. Send for circulars giving complete information.

RASMUSSEN MACHINE CO. RACINE, WIS.

They don't scrape THEY CUT

Simonds RED TANG Files have teeth like a metal-cutting saw . it teeth that take off more metal with less elbow-grease. Chips roll off in coils as they do from a cutting tool on a lathe. RED TANG Files cut quickly, freely, smoothly. And they stay sharp much longer than ordinary files. Corners do not crumble. Teeth do not clog easily.

Every RED TANG File is straight and For they are checked after every manufacturing operation—and again before packing—to guard against even the slightest defect. That's why it pays to look for the RED TANG on the files you buy. Always specify Simonds.

SIMONDS SAW & STEEL CO. FITCHBURG, MASSACHUSETTS BRANCH OFFICES IN PRINCIPAL CITIES



MADE BY SIMONDS METAL SAW MAKERS

1937

proosing adt for losed.

ection which at the iusted veight on a rough

n the easy luable

rents

ndicate e, and

-5

ATIC. te in-

VIS.

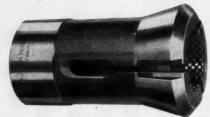
DIAMOND
TO COLLETS



Single-piece Collets for all automatic and hand screw machines



Master-type with diamond serrated pads.



Compensating Master-Type with diamond-serrated, self-adjusting pads for hot-rolled stock.

WRITE FOR COMPLETE CATALOG SUTTON TOOL COMPANY 2838 W. Grand Blvd., Detroit, Mich.

a possible electrical effect are as largely responsible for the binding of bolt threads as is the customary rust ing by humidity. In fact, simultaneous conditions of high temperature and rapid vibration appreciable cause pick-up of opposite metal threads in devices like the study of turbine cylinders and pipe flanges, threads of lead-cable presses and stop valves in steam engines. In some instances the binding of threads has required an oxy-acetylene flame before certain bolts could be removed.

Fortunately, colloidal graphite in aqueous dispersion painted with brush upon the previously cleansed metal portions will overcome these Two such applications. difficulties. followed by convenient drying methods, are advisable. Frequently, however, best results are obtained by hotdipping the bolts or study in dilute graphite solutions. Where flanges employ gaskets, the later elimination of sticking is accomplished by impregnating the latter with a dispersion of colloidal graphite in water, or by coating the gasket surface. Often times, penetrating oils containing colloidal graphite are effective for loosening bolts and threads.

The particular advantages of colloidal graphite dispersions for this type of application include its resistance to heat and oxidation, chemical inertness, and corrosion retarding characteristics.



DRILL THESE HOLES

By a Quick, Easy, Inexpensive Method Your business letterhead will bring literature WATTS BROS. TOOL WORKS Wilmerding. Pa.

or by Often g col-

e for

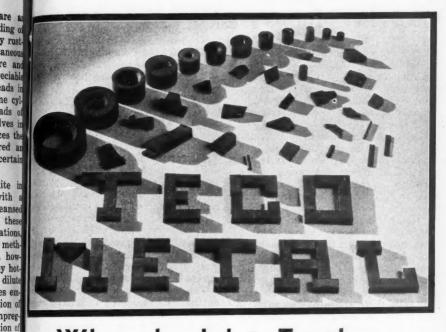
f colthis

esist-

mical

rding

E\$ thod



When the Job is Tough Ask for TECO

TUNGSTEN CARBIDE TOOLS

OU often have tough jobs. Why waste time and money inferior composition? TECO refractory carbide tools do the job better—faster—at more profit to you.

TECO can "take it". It's made for your TOUGH jobs. Eight grades are available for all types of machining operations.

Here are a few places where TECO CARBIDES are saving money — tipped lathe centers, counterbores, drills, reamers, milling cutters, standard turning tools, and wearing parts of

> all types. Put TECO Tungsten Carbide work in your plant -jobs don't come too tough for TECO.

Write today for catalog and revised price list.

356 E. CONGRESS ST., DETROIT, MICH.

Over the Editor's Desk

Toward a Common Goal

MPLOYEE compensation, profit sharing, and other angles of the same problem are again claiming a good deal of attention, due, probably, to the present existing economic and labor situations. With a shortage of skilled labor imminent in many lines, advantage of the opportunity has been taken in many quarters to raise the question of increased wages.

Every square-shooting employer likes to feel that he is paying a fair day's wage for a fair day's work, and in times like these—when the demands for increased compensation become more frequent and more abrupt—he begins to wonder where the workers are going to stop in their demands and what basis he can arrive at with his employees so that they will take their share of the grief in bad times as cheerfully as they demand the gravy in good times.

There is no question in the mind of this writer but that industry will have to come, ultimately, to a profitand-loss sharing arrangement of some kind. It is possible that employers would be willing to pay a higher wage scale in good times if the employees could be depended upon to systematically lay aside a percentage of their income against the day when the plant would be running on short hours, or not at all. But past experience has shown that the great majority of workers simply live on a better scale when their wages are higher, with the result that, when times are hard, those who have money have to pay it out to keep those who haven't, anyhow.

A great deal of friction that has developed recently can be charged to ignorance on the part of the worker concerning the details and costs of running a business. How this ignerance was eliminated in one manufacturing plant is told by George S. Whyte, President of the MacWhyte Company of Kenosha, Wisconsin, on page 72 of this issue.

Mr. Whyte says he has no patent on the idea.

Wagner Act Decision

A CCORDING to a bulletin from the Tax Research Institute of America, the most significant immediate effect of the Wagner act decision is the ease with which the most important principles of the old NRA can be reenacted in one or more separate laws. It is important, therefore, to study the provisions of the deceased NRA and to determine which provisions are very much alive and which others are likely to be enacted at this session of Congress.

The bulletin points out that whereas the NRA provided voluntary codes for individual trades or industries, the Federal Trade Commission now creates voluntary trade practice agreements. The NRA provided for consumer protection and representation; wider consumer protection is now planned through extension of FTC's control of advertising and proposed Pure Food and Drug Act.

Under NRA, violation of the code constituted unfair competition; proposed legislation will penalize violation of fair trade practices, even without injury to competition. Robinson-Patman bill creates NEW unfair practices. Every NRA code was required to contain a guarantee of collective bargaining, with no requirement to join the company union a condition of employment. Wagner Act gives these rights and defines unfair labor practices, including a number that were not included in NRA. Sec. 7a of the NRA didn't work, but Wagner Act will.

Who said the Blue Eagle is dead?

White for it like! User's intaining irration of interest of

one by of ha, ue. at-

om of 1eciost AS 18ehe ne ve be 38.

ees 28,

W ce or

ais of

0-

le)-

n

e e

e



M TEMPER **ALLOY STEELS**

Here's a steel especially developed for parts requiring great hardness, density of structure, resistance to wear and tremendous strength combined with toughness. Try HY-TEN "M" TEMPER for vital parts with the above requirements—it's a sure way to cut costs with no sacrifice in quality.

Prompt warehouse and mill delivery.

WHEELOCK, LOVEJOY & CO., INC.

130 SIDNEY ST. CAMBRIDGE, MASS.

WAREHOUSE SERVICE

Cleveland Chicago

for free copy of el User's Data Sheets, taining valuable Innation on use nent of steel.

Detroit

Buffalo

Newark

111

188

118

New Shop Equipment

Sykes Model 2-C Gear Generating Machine

A gear generating machine to be known as the Sykes Model 2-C has been developed and put on the market by the Farrel-Birmingham Company, Inc., 381 Vulcan St., Buffalo, N. Y. This ma-

Fig. 1-Sykes Model 2-C Gear Generating Machine

chine has a maximum diameter capacity of 25 in., minimum diameter of ½ in., maximum pitch of 3 DP helical and 2½ DP straight teeth, minimum pitch 24 DP, maximum face width 8 in., minimum face zero. Figure 1 is a front view of the machine. The door which covers the crank mechanism and the cutter index is shown open in Fig. 2. The No. 2-C machine, like all the other Sykes gear generators, operates on the gear shaper principle, using circular gearform cutters.

It is claimed that this new machine is equally suitable for tool room work, for general jobbing work, or for line production; and that it will cut every type of gear used for connecting parallel axes, including the well-known Sykes double helical continuous tooth gear having sharp apices, single helical gears

with helical angles up to 50 deg., straight tooth gears and internal gears with straight or helical teeth. In addition, it can be used for other types of work, such as cutting two members of a cluster gear simultaneously, machining cylindrical surfaces on shafts, pistons, and so on, cutting spline shafts, both parallel and taper, and cutting

and taper, and cutting some forms of cams. A further development is the cutting of a large quantity of gears, mounted in a gang, by means of numerous cutters working simultaneously.

The machine embodies many new features, some of which are as follows:

(1) Speed and feed controls are brought to the front of the machine.

(2) The speed and feed changespeed gear box is in one unit.

(3) All high speed moving parts are forced lubricated, including the main recipro-

cating carriage or ram, the helical guides, the cutter heads, the change speed mechanism, the change gears, the crank pin and its aliding block

(5) The slide-ways on the bed of the machine for the main saddle are covered in such a way that grit and dirt are prevented from getting into the sliding surfaces.

(6) Chips fall through the bed of the

(7) The coolant pump is driven by a separate motor and has extra large capacity so that when in operation the cutters are covered with coolant.

(8) The helical guides are new doublegroove type. The moving members and fixed members are approximately the same length. The moving members are hardened and

ight with n, it

allel

ms, lop-

1 8

ea-

ich eed

are

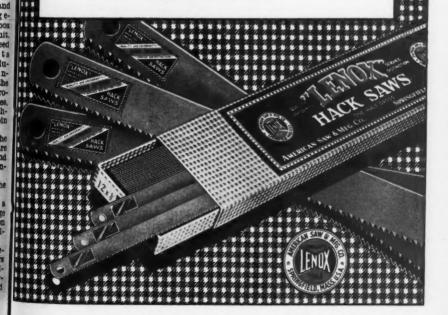
the

of ters

ork, ster

The Reach in the Peatel Boy

THE SUPERIOR CRAFTSMANSHIP OF LENOX BLADES WILL
HELP YOU TO CUT PRODUCTION AND REPLACEMENT
COSTS—TO DO BETTER WORK,
QUICKER, EASIER! THERE'S A
PLUS VALUE IN "THE BLADES
IN THE PLAID BOX". HAVE YOU
TRIED THEM LATELY?



key, 193



SAVING by cutting all die parts in one operation illustrates a striking advantage gained by users of DOALL Contour Sawing. As the American District Telegraph Company says of their DOALL operations, "Two days' work in two hours." Similar remarkable savings are reported by such companies as American Stove, Curtiss Airplane, Stevens Arms, General Electric, General Motors, and American Can. DOALL, the adaptable tool, is easy to investigate, simple to put in operation, quick to pay for itself.



The DOALL Contour machines are equipped with the Job Selector Dial, enabling operators to quickly determine the saw or file speed and other specifications for most efficient cutting. This exclusive DOALL advantage is one of the many features that bring enormous savings to DOALL users.

TO MAKE THESE SAVINGS

 Write us for formal quotation on DOALL.
 Send for Contour Sawing Handbook, sent free when requested on business letterhead.



CONTINENTAL MACHINE SPECIA th Washington Ave

- ground. The fixed members are made in high grade bronze and they are easily adjustable for wear; also, as previously mentioned, the helical guides are automatically lubricated.
- (9) The cutter heads, which embody the relief mechanism, are of un-usual design. The relief of the cutters is positive and when the cut is being taken the mechanism carrying the cutters is firmly locked rigidly with the cutter head itself. This insures rigidity as well as accuracy. All sliding surfaces in this mechanism, including the cutter spindles themselves and their bear-



Fig. 2-The crank mechanism and cutter index are enclosed.

ings, are hardened. This eliminates any appreciable wear and it is claimed that such a machine can be run for thirty thousand hours without showing wear sufficient to appreciably affect the precision. Nearly all parts which are likely to wear at all are provided with adjustment for taking up slack.

(10) An improved new infeed mechanism is fitted to the machine so that the machine is entirely automatic excepting for mounting the work and taking it off after it is finished.

(11) The unusually large face width capacity, together with the large hole (3½-in. diameter) in the main spindle and the rigid outer work support make the machine suitable for cutting gears or pinions integral with shafts, or when mounted on long sleeves, and also for a variety of special work. Attention is called to the large range of adjustment of the outer work support

are and rear; the cally oody unthe the

ism ked self. acthis tter ear-

tes is

can urs to

on. to

n-ist tic rk

a-ole in the ole e-ed a-is



In a series of advertisements published in this magazine, we have shown that our files in comparative tests win on every basic point.

You Make the Best Test of

Now-you make the best test of all. Test Nicholson, Black Diamond or Mc-Caffrey Files in your plant. Give them the test of EVERYDAY USE.

We welcome such tests, because Nicholson, Black Diamond and McCaffrey Files are made to meet conditions as they actually exist in hundreds of industrial plants.

You will find in your shops that these three leading brands save time and money, and are responsible for a definite increase in filing efficiency.

At mill supply dealers' and hardware wholesalers'. Nicholson File Company, Providence, R. I., U S. A.

PATENTS PENDING

A FILE FOR EVERY PURPOSE

The base of this support can also be used for carrying special quick-acting work fixtures.

To demonstrate the capabilities of the machine more clearly, the set-ups of various types of work are shown in diagrammatic form:

Fig. 3 shows the set-up for a double helical gear or pinion.

Fig. 4 shows the method of cutting,

Fig. 6 shows the method of cutting an internal gear.

Two members of a cluster gear can be cut simultaneously, or the machine will cut a large number of gears mounted in a gang. In the latter case there are 16 gear rings mounted on a cylinder, each ½ in. wide, and they are cut simultaneously by eight cutters mounted in two gangs of four each. Each cutter

operates on two gears so that the length of stroke is only slightly more than 1 in: therefore, one machine equipped in this way is the equivalent of eight single-spindle gearshaping machines The cutters are easily mounted with all the teeth in perfect alignment. This is done by first mounting the cutters loose on the cutter spindles; then they are engaged with a master gear, mounted in the work position, and then the cutter spindle nuts are tightened.

This new method has proved so successful that it has been applied, not only to the machining of gears, but to the machining of

peripheries of various articles such as pistons and steering gear shafts. For such applications plain disc-cutters are used, that is to say, gear-shaping tools without teeth; and the result is a finely finished cylindrical surface at a very low cost. The tool maintenance is very small and there is no trouble in tool-

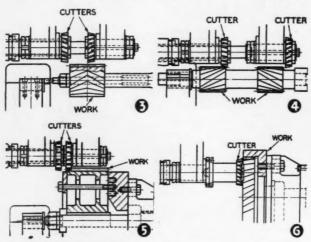
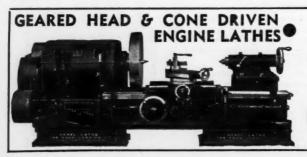


Fig. 3—Set-up for cutting a double helical gear. Fig. 4—Set-up for cutting, simultaneously, two helical gears spaced far apart and integral with the shaft. Fig. 5—Straight tooth gear being cut with two cutters, one cutter working on one stroke and one on the Opposite stroke. Fig. 6—"alting an internal gear.

simultaneously, two helical gears spaced far apart and integral with a shaft.

Fig. 5 shows a straight tooth gear being cut with two cutters, one cutter working on one stroke and the other on the opposite stroke. By this method there is no lost motion—no return or idle stroke.



Sizes 16" to 36" Swing

A full line of Gap Lather, 16" to 50" swing.

Write for complete Information.

AHN-LARMON COMPANY CINCINNATI, OHIO 1

Beyo

• You

that t

weldle

Patter

als

VESTEI

tting an be will unted e are inder, c cut unted

two
the
ke is
t 1 y
in.;
mad in
the
eight
gearhines.
easth all

erfect nis is nuntloose spiny are masunted

posithe nuts

suchas

not chinut to

g of n as

For are

tools

nely low very

tool-



• You can buy Williams' "VULCAN" Eye Bolts with confidence that they are *safer* and *stronger* because they're drop-forged, weldless, heat-treated, *proof-tested* and certified. Plain and Shoulder Patterns, shanks blank or threaded, in complete range of sizes.

also-WILLIAMS' THUMB NUTS AND SCREWS



• Drop-forged from tough steel, selected for easy, accurate threading and tumbled smooth. Many patterns and sizes. Furnished from stock, blank or threaded U. S. Std. Special threads, sizes, shapes and materials to order.

مرما

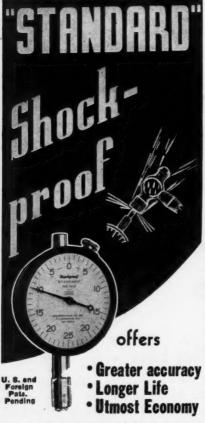
BUY FROM YOUR DISTRIBUTOR

J. H. WILLIAMS & CO., - 75 Spring Street, NEW YORK

Headquarters for: Drop-Forged Wrenches, (Carbon and Alloy) Detachable Socket Wrenches, "C" Clamps, Lathe Dogs, Tool Holders, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs and Vises, etc.

VESTERN WAREHOUSE & SALES OFFICE, CHICAGO - WORKS, BUFFALQ, N. Y.

May, 1



The new STANDARD Dial Indicator offers "Shockproof" construction which prevents the transmission of severest shocks to the gaging mechanism. Thus accuracy is protected and the useful life of the indicator is lengthened.

Furnished in above type with graduations of .001", .0005", .0001".

Write for new illustrated catalog.

For Better Gaging Come to STANDARD

STANDARD GAGE CO., INC.

setting; moreover, the work need not be tightly gripped and there is less danger of distortion, especially in the case of thin-wall cylinders or pistons.

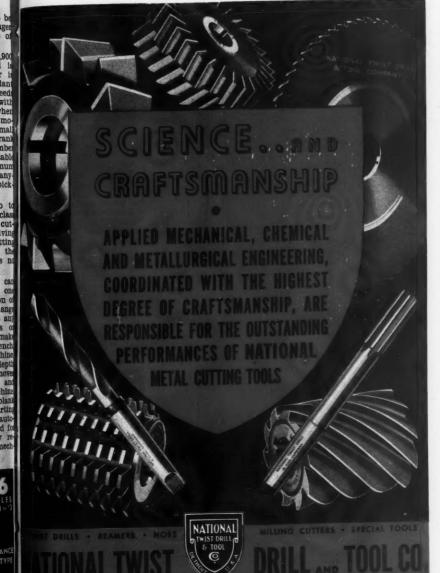
The weight of the machine is 13,900 lbs., and the floor space occupied is 111x87 in. The main drive motor is 5 h.p., and the motor for the coolan pump is ½ h.p. The number of speed available is eight when equipped with a two-speed AC motor; and when equipped with a DC variable speed motor the number of speeds varies in small graduations from 86 r.p.m. of the crank to 400 r.p.m. of the crank. The number of cutting feeds is four, in suitable steps, but the maximum and minimum rates of feed may be changed to anything desired by means of separate pickoff gears.

One operator can attend to two to four machines, depending on the class of work being done. The maximum cutting speed is 400 r.p.m. of the driving crank, which results in 800 cutting strokes per minute. Nevertheless, the machine runs quietly and there is no noise except the swish of the oil.

The automatic infeed mechanism can be adjusted to take anything from one cut to seven cuts for the completion of a gear or a gang of gears. The changin depth feed can be made without any special equipment, such as came of special dogs; all that is needed to make the change is an operating wrend which is supplied with the machine When the work is completed, the depth feed mechanism automatically more the work away from the cutters and trips a switch which stops the machine. The operator then places a new blank in position and operates the starting switch; afterwards everything is automatic. The machine is well adapted for cutting high precision gears now required for many newly developed mechanisms.



Hold-Heet Pyrometers



No Division, WINTER BROS. CO., Wro

Sundstrand 8-Spindle Vertical Lathe

Shown in Fig. 1 is an 8-Spindle Vertical Lathe, manufactured by the Sundstrand Machine Tool Co., 2531 Eleventh St., Rockford, Illinois, which has a number of interesting features. This particular machine was supplied for rough

Fig. 1-Sundstrand 8-Spindle Vertical Lathe

turning and crowning cast-iron pistons, but many other applications for this type of machine are possible.

The machine has a heavy cylindrical base on which an octagonal column is rotatably mounted. An electric motor, mounted horizontally on the base, provides power for rotating the column through a speed reducer and a gear box which contains pick-off gears for changing the speed of column rotation.

On each face of the octagonal column is securely bolted a sub-base having ways on which a Sundstrand self-con-

tained hydraulic unit travels vertically in an automatic cycle of rapid approach feed, and quick return which is governed by easily adjusted dogs. On the spindle of each hydraulic unit is a push button-controlled hydraulically-operated expanding chuck for holding the work-plece.

At the lower end of each sub-base on which the hydraulic unit slides is

mounted a stationary tool block is indicated at "A" in Fig. 2. As the central column rotates, downward movement of the hydraulic unit feeds the work-piece against the tool in block "A" to turn the outside diameter of the piston.

Pivoted on the side of each hydraulic unit is a heavy bell crank "B" having its inner end connected to a stationary adjustable rod "C". This arrangement causes the bell crank to swing about its pivot as the hydraulic unit moves downward. At the right time in the cycle, tool "D," carried on an arm of the bell crank, turns the curved head of the piston to the correct radius.

Running this machine is simple and easy. At the right of the operator's position is a four-button station in which one pair of buttons starts and stops rotation of the centrol column, the other pair starts and stops the eight motors which drive the hydraulic units. In normal operation, rotation of the central column is continuous. As a hydraulic unit approaches the operator, he presses one of the buttons in control box "E" (Fig. 2). This causes the hydraulically operated chuck to contact

and release the work-piece. Operator then substitutes a rough casting for the piece of work which has just been turned, and presses the other button in control box "E" which causes the chuck to expand and grip the new work-piece securely. As the central column continues to rotate it passes a limit switch which starts the automatic operating cycle of the hydraulic unit on which the work-piece has just been continues the hydraulic unit feed downerd, turns and crowns the work-piece.

and aut position. ally com hydrauliator aga the mea other se changed passed h

Here's Drill-securary plified equipy motor cone Drills netic with ecurate while

20"

CI

back

Furnis

 $-15\frac{3}{4}$

ly h.

n-d-

is

in

d-

lic

ck

of

ng

od n t

to

he

n-

in

ık.

of

he

aof

0-

ts rs ic

n,

1-

es ne

ol

pct

10

n

10

ţ.

n

it

)E



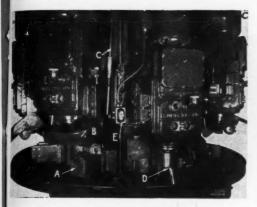


Fig. 2-Note stationary tool block at A.

and automatically returns to its upper position. The column has now practically completed one revolution and the hydraulic unit is approaching the operator again for changing work-pieces. In the meantime, the work-pieces on the other seven hydraulic units have been changed successively as each one has passed before the operator in its turn.

Tungsten carbide cutting tools are used throughout and provision is made for a copious supply of strained coolant to carry away dust and chips as well as to keep the tool and work-pieces cool. The hydraulic units, including their pumps and control valves, are standard products manufactured entirely by the Sundstrand Machine Tool Co. The units are entirely self-contained, each is independent of the others, and one or more units can be removed from the machine at any time without interfering with the operation of the remainder.

The pistons machined measure 3½ in. diameter by 4¼ in. long, are turned by this machine at the rate of slightly more than 400 per hour at 85 per cent

efficiency.

Colonial "Universal" Broaching Machine

A modern all-purpose broaching machine has just been announced by Colonial Broach Company, 147 Jos. Cam-

CANEDY-OTTO

20" Sliding Head Motor Driven Drill For Production or Precision Drilling

Here's another rugged and well-balanced Canedy-Otto Drill—precision built from the ground up to give fast, accurate drilling. Vertical Motor Drive provides simplified construction. Driving units are completely equipped with Timken Roller Bearings, the motor and motor cone pulley with ball bearings, and the spindle cone with roller bearings.

Drills are equipped with push button control and magnetic switch. Desired belt tension is easily obtained with convenient, simple arrangement. Self feed is accurate and powerful. Four changes of feed can be had while drill is operating. Capacity for $\frac{7}{8}$ " drills without back gear— $1\frac{1}{4}$ " with back gear.

Furnished in single, two, three and four spindle type —1534" center distance of spindles.

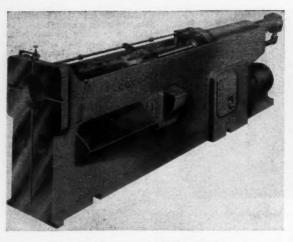
Write for latest bulletin.

"READY FOR THE JOB"

CANEDY-OTTO MANUFACTURING CO.
CHICAGO HEIGHTS ILLINOIS



May, 1



Colonial "Universal" Broaching Machine

pau Ave., Detroit, Mich. Designated as "The Universal" Broaching Machine, it represents a combination of utmost flexibility and adaptability together with high production speed and automatic operation. Designed for pull type

broaching and hydraulically operated, it is as readily adapted to surface broaching as to the broaching of holes, round or splined, helical or straight, and so on.

In this machine have been incorporated all the findings of years of intensive cooperation on broaching with industry by this firm. Available in two basic stroke designations—48 to 60 in.—the machine comes in four tonnage capacities: 6, 10, 15 and 20 tons.

Stop collars are provided on the machines so that any requirement as to stroke length can be met, in accordance with the work to be done and the broach being used, assuring maximum production capacity.

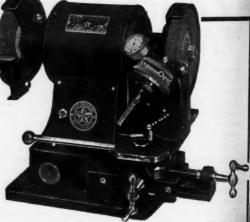
Standard cutting speed is 30 ft, per minute. But again, a conveniently placed control permits adjusting of cutting speed to any speed up to this figure that may be desired. Return speeds of either 60 or 100 ft. per minute are op-

Grinds

81 SIZES OF

No. 31 to 1/2"

This Star Precision Grinder puts drill grinding on a production basis. Its simplicity and accuracy saves as high as 50% on drill costs and insures uniform accuracy that guarantees perfect holes and increases production.



Write for descriptive folder.

STAR MACHINE & ENGINEERING CORP.

Division of Star Electric Motor Co.

BLOOMFIELD AVE.

BLOOMFIELD

NEW JERSEY

Droll Filli Duckworth requiring d Write for

2/7

r-he OT ve non try ole

in 88:

ro-nes ent ent

one ing um per ut-ure of op-



• More than 480 mattresses, any size, any quality-filled in an eight hour shift. That's production! And it's done every day with machines

Baldwin-Duckworth roller chain is an integral factor in the whole 93 individual chain operation. drives are used on each of these

Oroll Filling Machines. This is a further example of the adaptability of Baldwin-Duckworth roller chain to any elevating, conveying or power transmission problem requiring durable, economical operation.

Write for catalog. Baldwin-Duckworth Chain Corporation, Springfield, Mass.



UNIVERSAL



DRILL BUSHINGS

FIRST COST 10% LOWER

EXCEPTIONAL LONG LIFE

MADE TO A. S. A.

SPECIFICATIONS

INTERCHANGEABLE

PROMPT SERVICE

ACCURATE

LONG LIFE

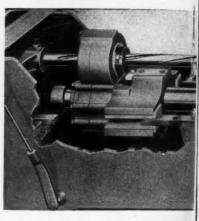
LOW COST

LOW COST

UNIVERSAL ENGINEERING CO. FRANKENMUTH, MICH.

tional and are controlled by a differential area design in the operating cylinder.

For surface broaching, the unusualy large face plate capacity, with its two keyways for ease and accuracy of location of even extremely large surface broaching fixtures, is noteworthy. Toos up to 9 in. in width or even slightly larger, may be used with this machine. The need for follow rests for the handling of very large broaches of course has been recognized, and provided for in



Special Spiral Drive Attachment for Broachin, Internal Spiral Splines

the design for ready application when needed.

For broaching of internal helical splines, either straight or involute, is spiral drive attachment has been developed for this machine. It consists of a rigidly mounted spiral master but which, through gears, causes the broact to rotate as it passes through the work producing the correct helical lead in the finished part with greater accuracy eliminating side thrust and drag on the sides of the splines, and increasing broach life. All machines are furnished with mounting pads for this attachment. The machine may be operated from either the right or left sides, dual controls being provided.

A complete range of broach pullers is available with the new "Universal". Included are the recommended automatic pullers designed for maximum accurace in maintaining alignment and proper broach locating; also threaded puller for the broaching of keyways, if de

The

back

no sing

UN:

at th

Ther

STAND

Pirm ...

Address

sually standard localocatrooks ghtly chine.

ourse or in

hin

her

ica de-

ists bar act

ork

in

the

ing hed nt

on

in-th

BC!

Address

Can't loosen this Self-Locking Nut!

The unique, live gripping features of the UNSHAKO hold it tight despite the severest vibration and jarring. Yet it backs off easily with the aid of an ordinary wrench — can be re-used.

UNSHAKO is entirely self-contained no separate pins or washers. A self-locking ring or floating thread, working on the brake band principle, clinches it tight at the exact degree of adjustment desired.

Get the details today. Use the coupon. There's no obligation.



The Nut that can't shake loose



Cutout Section Showing Ring in Place

STANDARD PRESSED STEEL CO.

BOSTON

JENKINTOWN, PENNA.

BRANCHES

CHICAGO

ST. LOUIS

DETROIT

INDIANAPOLIS

BOX 556

SAN FRANCISCO

May, 19

MARKING

FLAT—ROUND IRREGULAR SURFACES BY ROLLING OPERATION



MODEL 25 HI-DUTY MARKING MACHINE

This machine operates from your plant air line, and is one of numerous models built to produce fart, neat marking on metal parts. HI-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc. 1806 BELLE PLAINE AVE. CHICAGO, ILL. sired; and key-type pullers where manmum simplicity and low cost are desired. Puller adjustment is simplified by the provision of locating markers on the cross-head and pull-head. Chip removal presents no problem

Chip removal presents no problem with this machine. Furnished with every machine as standard equipment is a chip trough designed to accommodate the longest broach which might be used on the machine. From this trough all drippings and chips drain back into a chip pan provided with perforated trays, permitting the coolant to drain back into the sump and the chips to be removed from either side of the machine. Crossheads have easily replaceable hard bronze shoes which travel on hardened and ground ways for maximum life. The hydraulic power mechanism consists of an enclosed, externally located (for accessibility) electric motor direct-coupled to a 1000-lb. hydraulic pump. Coolant pumps are of extra generous capacity.

Cleveland Universal Type 48 Jig Boring Machine

Outstanding features of the Type 48 Precision Jig Boring Machine shown in the accompanying illustrations are great rigidity, extreme accuracy of construction and ease of control. This tool has been designed and built by the Cleveland Universal Jig Company, 13406 St. Clair Avenue, Cleveland, Ohio.

As the illustration shows, the design of the machine incorporates a substantial base, a table of ample size, rigid uprights for carrying the crossrall, a crossrall and spindle saddle. The base is of box type design ribbed to eliminate vibration and provided with one flat and one V-way on which the table travels. The table has a working surface of 40 x60 in. and is provided with eight T-slots and one aligning slot at the center. The table longitudinal screw is fitted with a 6-in. dial graduated to thousandths of an inch, and to facilitate closer settings this dial is equipped with a vernier. Accuracy of settings made with the dial and vernier are, of course, governed by the accuracy of the screw itself.

To provide further accuracy a vernier slide runs the entire length of the table and by means of this slide it is possible to make settings with great accuracy so that holes spaced by means of this vernier will be within a small fraction of a thousandth of an inch to the predetermined dimension. Adequate means are provided for lubricating the table ways and ample provision is made to

E O R

red. the the lem evlate sed all 0 8 ays, ack reine. ard ned ife. onted ctnp.

ig

in eat has ve-St.

ign angid

ate els. 40 Tter. ted us-

ate

ith

ade

rse,

ew

ier ble ble his on

rens

INER CYLINDRICAL GRINDING



ROR GRINDING cylindrical parts, Bakelite Resinoid bonded wheels not only speedup output, but also produce finer, more accurate surfaces, with less wheel-dressing. On other types of grinding, as well, the

great strength and heat-resistance of these wheels afford economy and consistent safety, even at speeds up to 16,000 s.f.p.m. Write for instructive booklet 47G, "High Speed Abrasive Wheels".

BAKELITE CORPORATION, 247 PARK AVENUE, NEW YORK, N.Y. BAKELITE CORPORATION OF CANADA, LTD., 163 Dufferin Sireet, Toronto, Cal.

BONDED WHEELS

FOR GRINDING SPEED ECONOMICAL HIGH

May, 19

guide the table ways against the intrusion of chips. The table screw is driven by a ½ h.p. General Electric motor. The table movement is controlled by a conveniently located pushbutton switch.

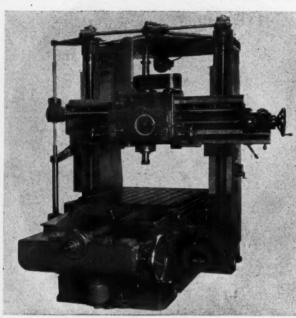
The crossrail is fitted with a traverse screw for traversing the spindle saddle. This screw is provided with a micrometer dial fitted with a vernier, while also a vernier slide is provided to facilitate the making of correct cross settings. The

crossrail is raised and lowered by a ¾ hp. General Electric motor, for which a conveniently located push-button switch is provided.

The spindle saddle is massive in construction and is fed across the crossrail by a % h.p. General Electric motor provided with a pushbutton control. Hand control wheels are also provided for the table, saddle and apindle movements.

The spindle is driven through the medium of a 7½ hp. New Departure Transitorq motor which provides a variable speed. Drive from the motor is through a shaft at the side of the lefthand housing, from thence to the crossrail shaft and and then to a vertical shaft on the spindle housing. Power from this shaft for high speeds is transmitted to the spindle

to the spindle through four V-belts. One object of the V-belt drive is to eliminate all vibration to the spindle, which factor is of utmost importance in a machine of this kind. Lower speeds are transferred by means of worm gears. The spindle is alloy steel, finished by grinding, and it



Cleveland Universal Type 48 Precision Jig Boring Machine

The uprights which accommodate the cross rail are securely bolted and dow-eled to the base and are fastened at the top with a crosstle. These housings are hollow and accommodate the compensating weights which counterbalance the cross-rail and spindle saddle.

for more than 1001 odd jobs



The Hjorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

Write today for data and prices.

HJORTH LATHE & TOOL CO., 12 BEACON ST., WOBURN, MASS.

averse addle, crome also litate

The and h.p. mo-

concated ch is

addle confed il by neral pro-ushland are the bne ts. 1 18 the h.p. hich able the of ing, the and ical ndle

tted dle the tion utthis by



Barnes Blades never let you down. We make them carefully, to give you honest, efficient, faithful, long service. Next time, try Barnes. There's a supply doaler in your territory who stocks them.

W. O. Barnes Co., Inc., Detroit, Mich.

May, 19

operates in precision ball bearings of generous proportions. The spindle nose has a taper of 3½ inches to the foot while chucks, boring tools, etc., are securely held in place by means of a screw retainer at the spindle bottom.

This machine occupies a floor space of 9x11 feet while its overall height is 9½ feet. The weight is approximately

eight tons.

164

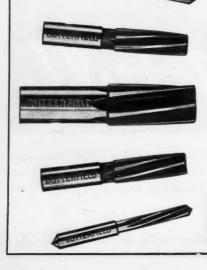
Landis 12 x 28-In. Universal and Tool Grinder

The Landis 12x28-In. Universal and Tool Grinder illustrated has been brought out by Landis Tool Company, Waynesboro, Pa., to provide industry with a highly flexible universal machine capable of meeting the most exacting demands with respect to finish and accuracy. The machine is especially efficient on the sharpening of gear cutters, milling cutters, reamers, taps and similar parts, and with standard equipment it is suitable for many surface grinding and internal grinding operations in addition to the usual external cylindrical operations. Extra equipment includes the necessary attachments for hob grinding, circular forming tool grinding, large saw grinding, staggered tooth gear cutter grinding,

and many other special operations of the toolroom variety. A water reservoir is cast integral with the bed of the machine to provide for wet grinding.

The wheel head may be swiveled 90 deg, in either direction and may be raised, lowered, or fed toward or away from the work. The headstock may be swiveled as much as 90 deg. for face grinding and used for either dead spindle or live spindle work. The motor is mounted on the rear of the head, from which point it drives the spindle by means of a V-belt. The motor is easily adjusted to obtain the proper belt tension. The entire wheel spindle housing may easily be removed when it is desired to apply the special grinding head. Vertical movement of the head is through a screw and nut arrangement. The weight of the column and head is not supported by the feed screw, but is counterbalanced in such a manner that the screw and nut action feeds the head downward against constant back-lash tension; thus the wheel does not have a tendency to drop into the work. The column is protected from dust and grit. Two motor pulleys and two spindle pulleys are supplied, making three different wheel speeds available.

The headstock is powered by a con-



TIME and MONEY SAVERS

BUTTERFIELD

STUB REAMERS
for
SCREW MACHINES

SIZES 00 TO 23 RANGE .0600 TO 1.010

Write for Circular

UNION TWIST DRILL CO.
BUTTERFIELD DIVISION

DERBY LINE

VERMONT

f the dr is

d 90

be away

face

spinor is

from

ten-

de-

lead.

nent.

it is

that nead lash

ve a The

grit.

pulffer-

on-

asily

IA your steel stock A WHITE ELEPHANT

Carrying large stocks in your plant is often expensive and unnecessary, especially where cold drawn steels are concerned.

Union Drawn Distributors give a service so dependable and satisfactory that many manufacturers are safely keeping their inventories at an absolute minimum. Tied-up capital has thus been released, depreciation lowered and large savings made in warehouse labor, insurance and maintenance costs.

Quick response to your needs is the main service of Union Drawn Distributors. They can become a definite part of your operations, maintaining frequent deliveries timed to meet your production schedules.



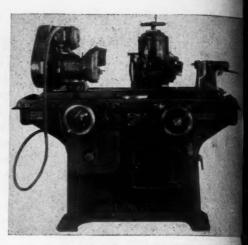
Union Cold Drawn Steels

stant speed motor. Three speeds are available, the change being quickly and easily made by shifting a single V-belt at the left hand end of the head. The number of speeds is doubled by changing the pulley on the right hand end of the jackshaft.

The traverse drive is a self-contained gear box of unusually simple design. Four speeds are provided, the change being made by moving a knob at the front of the bed. Power drive may be disengaged for hand traverse. The design is such that the work and traverse start and stop lever can be made to start work rotation without work table traverse, start both work rotation and work table traverse, or start work table traverse without work rotation.

The universal head will hold all forms of milling cutters by

their shanks or with them mounted on arbors. In addition, it will hold cutter bars which will receive work mounted on sliding shells. The table shank mill sleeve supplied with this head is intended for grinding of end



Landis 12 x 28-In. Universal and Tool Grinder

mills held by their own shanks. The base is graduated a full 360 deg. while the head itself swivels 90 deg. either side of zero. Vertical adjustment to the head is also provided.



Get Way Behind that Decimal Point

with e

WICACO GRINDER

Shoulder Grinding by Power Feed
The WICACO Internal Precision
Grinder is the last word in accuracy.
Years of exhaustive testing under
severe actual shop conditions have
proved that the WICACO will givecloser tolerances, maintained to
longer periods . . . higher production
. . . lower grinding costs.

If you are looking for extreme accuracy in internal grinding equipment, it will pay you to try the WICACO.

The Wicaco Machine Corp.

Established 1868

Wayne Junction, Philadelphia, Pa.

action Delivery Reamers and End M

AVOID Costly delays MAINTAIN Production schedules

(a) a) a) af af

Originators of the Helical Taper Pin Reamer We are Spiral Specialists Submit your Reaming Problems to us Ask for Catalog G

GAMMONS-HOLMAN COMPANY MANCHESTER CONN

WALKER-TURNER



sealed SKF ball bearings.

\$ 7695

Belt Sander Disc Sander "Stroke" Sander

Including ½ H.P., 1750 R.P.M. Motor

The SM900 Universal Surfacer sets a new high in single machine values. Never before has so much been offered at so low a price. The SM900 surfaces wood, metal, bone, plastics, cork and countless other materials with amazing ease and speed.

Write to-day for complete details and specifications.

WALKER-TURNER CO., INC.

757 Berckman St.

Plainfield, N. J.

Engineered POWER TOOLS

The maximum distance between centers with the universal headstock is 28 in.; with left hand footstock, 33% in. The machine will carry a maximum weight of 200 lbs. on centers, and will grind a maximum diameter, with full size wheel, of 12 in. The work swing over the table with water guards removed is 12½ inches.

The three speeds available for the grinding wheel spindle are 2385, 3180 and 4000 r.p.m. The total grinding wheel cross feed movement is 8 in. Six work speeds are provided of 75 to 505 r.p.m. Maximum traverse of work table, 30 in. Length of grinding at one setting, 28 in. Work table traverse per minute, four speeds of 12, 21, 35 and 60 in. Grinding wheel motor, 1 h.p., 1800 r.p.m. Traverse drive motor, ½ h.p., 1200 r.p.m. Headstock drive motor, 1/6 h.p., 1200 r.p.m. Floor space required, 4 ft. 3 in. by 7 ft. 3 in. Weight of machine net, 3500 pounds.

Extra equipment includes a wet grinding attachment, internal grinding fixture, hob grinding attachment, adjustable vise, surface grinding head, circular forming tool grinding equipment, gear cutter grinding attachment, single speed headstock, face mill grinding attachment, and end mill grinding attachment.



Dutstanding in every detail for heavy blanking and forming work.
All stresses are taken centrally.

Write for new catalog illustrating and describing this and other presses.

Zeh & Hahnemann Co.

184 Vandelpool St. Newark, N. J.

May,

WIRE BRUSH One of operation perform Flexible

In

RG.

937 cens 28 in.

will full wing re-

the 3180 ding

Six 505 ble,

setper 1 60 1800

1/6 red, ma-

nd-

fix-18t-

ılar

gear eed chent.

POLISHING AND CLEANING ALUMI NUM WASHING MACHINE TUB CLEANING ALUMINUM HAM BOILER WIRE BRUSHING TIRE MOLD CLEANING CAR-BON FROM RUBBER The state of the formation of the state of t WIRE BRUSHING One of the many operations best
performed with
Flexible Shaft equipment.

HASKINS

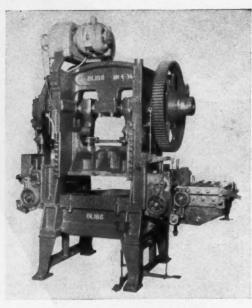
Investigate the adaptability of Haskins Equipment for your requirements

PG. HASKINS COMPANY . 4667 W FULTON STREET . CHICAGO, ILLINOIS

are standard

Automatic Double Crank Press

The E. W. Bliss Company, 1420 Hastings St., Toledo, Ohio, is announcing a new and improved design of their No. 4



Bliss No. 4 H. S. Automatic Blanking Press

high speed automatic blanking press, which has been designed and built at their Toledo plant. This press, though single geared, will operate from 30 to 90 strokes per minute through a variable speed drive. This range of speed is to permit selection of the best operating conditions to suit the length of feed and the gauge of metal to be run. A con-

venient hand chain controls the speed adjustment of the variable speed drive. A magnetic line starter and a push button control the 5 h.p. driving motor, which in turn is connected to the

leasing

th in turn is connected to the flywheel by means of V-belta. The high speed rolling key clutch, locking pawl and re-

brake

features on this new press.

The stroke of 1½ in and an adjustment of 3 in has been provided. The shutheight bed to slide, stroke down, adjustment up is 11½ in while the bolster is 4 in thick with a 25-in cored hole in the center. All main and connection bearings are bronze bushed with a crankshaft running on Timken roller bearings.

roller bearings.

A few of the principal dimensions are as follows: Slide area 28 in. by 31 in., bed area 34 in. by 35½ in., 4-in. diameter of crankshaft at bearings 6-in. diameter at connections and a distance of 36 in. between unrights.

tween uprights.

A "Bliss" high speed double roll feed, with a seven roll driven straightener and a shear type scrap cutter with regular press gibbing, is mounted on the press. It is arranged to take coil stock 24 in. wide, right to left through openings in the housings. The upper blade of the scrap cutter can be adjusted to increase or decrease the cutting clearance. Feed rolls are 25 in. wide and the feed

length is adjustable from 0 to 25 inches. This press was originally developed for use in the rolling mills to blank out large circular or irregular shaped blanks for the trade. In this way a saving was made due to the elimination of the shipment of scrap. The press is also of in-

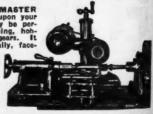
terest to any firm having a fair produc-

Adjust Two Bolts and--PRESTO

Your lathe becomes a machine of many functions. THE MASTER LATHE CONVERTER is precision built, is easily mounted upon your lathe and instantly becomes a universal tool with which may be performed such operations as milling, grinding, drilling, broaching, hothing. It cuts keyway, spline shafts, gears. It hobs worm gears. It broaches internal keyways. It grinds internally and externally, faceplate and shaft grinding.

Write for illustrated pamphlet.

MASTER MACHINE & TOOL COMPANY
P. O. Box 7365, North Kansas City, Missouri



May, 19

eter. blanking

In the

To complet operated

must b

rate. F
chine &
pany, 1
is annox
of their
crank p
wheel ty
tor driv
dient p
flywheel
required

The construction pearlitically.

The p

peed

rive. oush mo-

the

elts. key

re-

dard i an

ust-

h a ken

lide area am-

ngs, ions beible roll resi ılar on to ide,

ngs per

can de-

ace. eed nes. for out nks

WAS ip-

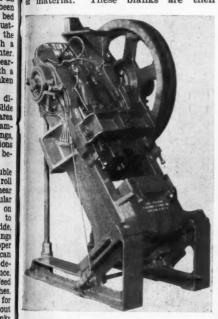
in-

uc-

gon of blanks up to about 24-in. diam-Larger and smaller automatic Manking presses are now available.

"Toledo" No. 54 Repunching Press

In the large quantity production of feld and rotor laminations, the blanks me cut from full size sheets in a large automatic press, for maximum economy d material. These blanks are then



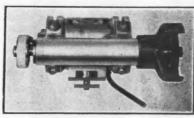
Toledo No. 54 Repunching Press

completed in suitable compound dies operated in repunching presses which must be exceptionally rigid and accu-rate. For this service The Toledo Ma-chine & Tool Division, E. W. Bliss Com-pany, 1420 Hastings St., Toledo, Ohlo, is announcing to the trade a new design of their No. 54 straight sided, single crank press. This press is of the fly-wheel type, with a direct connected mofor drive to the flywheel by means of a dlent pinion meshing with teeth on the flywheel. A 3 h.p. 820 r.p.m. motor is required to drive the press.

The frame is of compact one-piece construction cast in chrome-nickel earlitic semi-steel for maximum rigid-

The press has a 21/2-in. stroke, distance I





FITS ANY SIZE LATHE

Short Belts eliminate centrifugal slap and tendency to vibrate. Speeds from 7000 to 36000 R.P.M.

Write for catalog.

THE McGONEGAL MFG. CO. JONES BUILDING EAST RUTHERFORD NEW JERSEY



Pay Big Dividends in Time Saved SEND FOR NEW BULLETIN

Gallmeyer & Livingston Co. 308 STRAIGHT AVE., S. W. GRAND RAPIDS, MICH.

METALLIZING CO. of AMERICA, Inc. 1351 E. 17th Street LOS ANGELES, CALIF

bed to slide 13 in., full eccentric shaft, and a bolster with T-slots and poppets for inclined die setting. The shaft has a diameter of 4 in. at the bearings and a diameter of $6\frac{1}{2}$ in. at the pin. It operates at the rate of 65 to 90 strokes per minute. The fixed legs hold the press at an angle of 40 deg. with the vertical and support the press at the back by heavy steel rods.

The slide face measures 14 in. square, with a 2-in. diameter recess and T-slots. The slide, which has extra long and accurate gibbing, actuates a cam stripping device, adjustable for stripping at any point of the stroke. It also has an adjustment of 1/2 in. for the length of

Lubrication requirements are taken care of by a one-shot manually operated grease device along with sight feed oil cups.

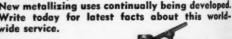
B. & S. "Standard Type" and "Dual Control Type" Plain and Universal Milling Machines

The eight newly-designed Plain and Universal Milling Machines in the No. 2 and No. 3 sizes recently announced by the Brown & Sharpe Mfg. Co., Providence, R. I., retain all the best features

ZIN META Forge ahead the modern way with a money-making MOGUL! Builds up, fills in, relines, refinishes.

Successfully salvages worn, corroded surfaces and parts.

New metallizing uses continually being developed. Write today for latest facts about this worldwide service.





Multiple Savings for Contract Shops and

shaft, ppets t has s and n. It rokes the 1 the

the

uare, slots. d acpping any adaken rated d oil

and and and No. nced rovitures



LOWER threading costs on long runs—are possible with circular or tangent Long Life chasers in Geometric Style TH Stationary or Style TR Rotary Die Heads. Accurate fine adjustment, rigid chaser support, sturdy construction, are featured. Shall we send you literature?

THE GEOMETRIC TOOL CO.

NEW HAVEN, CONN.

May,

of the Standard and High Speed models which they replace, and in addition have numerous improvements which have been made to meet present-day milling requirements and to facilitate operation.

The machines are available in two

positions are important. Both styles are "high-speed" machines, with 18 spindle speeds ranging from 30 to 1200 r.p.m.

All machines of the new design are available for either overhead or motor drive; and when motorized, a single standard-type motor mounted

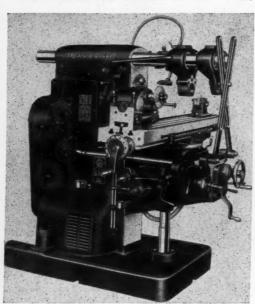
standard-type motor mounted in the base is the source of power. The machines are of sturdy build, with ample strength and rigidity to utilize the full power input without loss of accuracy.

Other important features common to these new milling machines are: fast travel for all movements (140 in. per min. longitudinal, and 56 in. per min. transverse and vertical); safety handcrank for longitudinal adjustments of the table; automatic lubrication of knee and column mechanisms; and rotating speed and feed rate selective levers, designed for greater ease of operation. Furthermore, all eight machines have two-position control of feed engagement, of the direction of all feeds, and of the starting and stopping of the entire machine.

In addition, the "Dual Control Type" machines have dual control of all fast travel movements and hand adjustments, so that complete control from both front and rear operating positions is provided. Machines of this style also have 32 rates of feed, from 9/32 in. to 40½ proper min longitudinally and

in. per min. longitudinally and 1/8 in. to 161/8 in. per min, for transverse and vertical feeds.

The "Standard Type" milling machines have 16 feed rates, 11/16 in. to 26 in per min. longitudinal and 9/32 in. to 10% in. per min. transverse and ver-



Brown and Sharpe No. 2 Universal Dual Control Type Milling Machine

styles: the "Standard Type," for the more straightforward run of manufacturing or toolroom work, and the "Dual Control Type," where the work is such that wide feed range and complete control from both front and rear operating



GREENERD
Arbor Presses
500 lbs. to 35 tons pressure

HYDRAULIC, MOTOR DRIVEN, HAND OPERATED

Greenerd Arbor Press Co., Nashua, N. H.



READ

for app neymen, valuab designer cerned v seel." J. Director The Yal

workabl anyone in the ty is using standing inback o

"Here is author which There is every to out of fi know m and the reading

Just a fi will ans

Ho

fu Ho is Sh bri cra Te bro

1937 styles h 16 1200 n are

motor single unted

ce of re of

nple itilize thout

tures illing

l for

per 6 in.

ver-

for of

orica-

lumn

ing

ective

ease

e, all

posi-

gage-

and

hine.

Con-

dual

love-

ents.

from

ting

ines

ates

404

and

ans-

ines

in

ver-

Here at last is a book for the man who

makes tools-a plain, practical, common

sense explanation of how to make tools

that last longer. It will help you show

your company how to get bigger produc-

tion and how to bring down tool costs.

TOOL STEEL

SIMPLIFIED

By FRANK R. PALMER

Assistant to the President

The Carpenter Steel Company

315 Pages, 6x9. 205 Illustrations, \$1.00

This is the first book to give the tool

maker simplified methods for the selection

It is a handbook of modern practice for

the men who are responsible for your

and heat treatment of tool steel.

How to Select and



READ THESE COMMENTS:

"... a valuable text book for apprentices and journeymen, and an equally valuable handbook for designers and others conæmed with the use of tool

J. B. CHALMERS
Director of Training School
The Yale & Towne Mfg. Co.

. Part Two offers a workable method by which anyone can make changes in the type of tool steel he is using with some under-standing of the theory inback of his efforts.

CARL G. JOHNSON Worcester Polytechnic Institute Worcester, Mass.

"Here is a volume which the author calls a handbook but which is very much more. There is no question but that every tool maker and four out of five metallurgists, will know more about tool steels and their treatment after

K. H. CONDIT Editor, American Machinist

Just a few of the problems this book will answer for you:

HOW to stop tools from warping— How to avoid grinding checks—How to make tools wear longer—What furnace atmosphere shall I use?— How to make the spark test—What is a Monotron Hardness Tester?—Shall I quench in fresh water or brine?—How does tool design affect tacking?—What is the Shepherd P.F. Test?—How to make tools that won! treak—How to prevent size change—How to be a trouble shooter.

"It is simple and

STOUGHTON,

easy to read and contains interesting and useful information which I am sure will commend it to technical men, semitechnical men and men in the shops who want to improve

Department of Metallurgical Engr. Lebigh University,

their ability to make the best use of tools and tool steel." PROF. BRADLEY

315 Pages

For the Man Who Wants to Get Bigger Production and Lower Costs

THE CARPENTER STEEL CO. READING, PENNA. Dept. A-3

Please send me postpaid the convenient new 315 page handbook—"Tool Steel Simplified." I am inclosing \$1.00. (Price \$3.50 outside U. S. A.)

Signature	
Address	
City and State	

Firm or Employer___

Occupation_

-to check up on your methods -to get quicker answers to tool problems -to save time and effort -to simplify your work

tools. You will want it:

in the U.S. A.

postpaid



I want a hoise 4000 LBS. x 20'x CAB

Yes, and you can get it in a LO-HED hoist. A LO-HED hoist of 4000 pounds capacity, 20 foot lift, controlled from a cab, is only one of 98 standard LO-HED hoists with and without cabs. With this variety to choose from you can designate your individual needs in capacity, hoisting speed, height of lift and type of trolley. You are virtually sure of getting what you want in a standard LO-HED . . Remember, a standard hoist costs less to buy and a LO-HED always costs less to maintain.

AMERICAN ENGINEERING CO. 2451 Aramingo Avenue, Philadelphia, Penna.



Other Products: A-E-CO Taylor Stokers, A-E-CO Hole-Shaw Pumps, Motors and Transmissions, A-E-CO Marine and Yacht Auxiliaries.

	nen: Ploase send me your com- catalog showing how to select a holst.
Name of	Company
Company	Address
Your Nam	0
Your Title	***************************************
111111111111111111111111111111111111111	

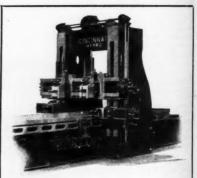
tical. A Wide Feed Range mechanism, giving 32 feed rates of the same range as on the "Dual Control Type" machines, is available as an extra for the "Standard Type" machines.

South Bend Underneath Belt Motor Drive Lathe

The South Bend Lathe Works, South Bend, Indiana, announces a line of backgeared, screw cutting, precision lathes in the new Underneath Belt Motor Drive. The new series of lathes are offered in 9, 11, 13, 15, and 16 in. swing, and in bed lengths from 3 feet to 12 feet.

The new underneath belt motor drive is unusually compact and is silent, powerful, and economical in operation. The motor and driving mechanism are fully enclosed in the cabinet leg underneath the lathe headstock. There are no exposed pulleys, belts, or gears and no overhead belts or pulleys to obstruct vision or cast shadows on the work.

The belt drive is the outstanding feature, as it is silent in operation and provides a smooth steady pull free from vibration and chatter. Power is transmitted from the motor to the countershaft by V-belt, and from the counter-



PLANERS

Double Housing, Openside

CRANK PLANERS PLANER TYPE MILLERS VERTICAL BORING MILLS

Write for Bulletin

THE CINCINNATI PLANER CO. CINCINNATI

May, 19

nge nes, nd-

ck-

in ive. in

ive w-

lly

no ict

nd

WE ASK YOU--

Are your roughing inserted tooth face mills designed for Maximum blade life?

They would be if you were using

Jr & Jr

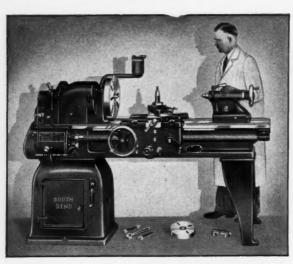
inside cone type design.



The adjustment is positive and uniform, making it unnecessary to scale each blade as it is set out, as well as being in the direction to compensate for major blade wear.

THINK IT OVER

GODDARD & GODDARD CO. DETROIT, MICH.



South Bend 16 x 6-Ln. Underneath Belt Motor Drive Lathe

shaft up through the lathe bed to the headstock cone pulley by a flat leather belt.

Adjustment is provided for taking up

belt stretch and for obtaining any desired tension on both the motor belt and cone pulley belt. A belt tension release lever conveniently located on the front of the cabinet leg permits the easy shifting of the cone pulley belt.

The down drive for the spindle will be appreciated by the engineer and mechanic as the pull of the belt is down against the solid portion of the headstock. The reversing motor and reversing switch permit starting, stopping, and reversing the lathe spindle from an easy working position in front of the lathe. The lathe spindle may be instantly reversed when cutting screw threads by throwing the switch directly from "forward" to "reverse" position.

The lathes have a number of new features and improvements, the most outstanding of which are: heat-treated headstock spindle with all bearing sur-

FORMING A PITTSBURGH LOCK ON

erson ALL STEEL JUNIOR RESS BRAKES

Whether the machine used is our No. 1038, having 22 tons capacity, or our No. 2062 Heavy Duty, having 45 tons rating, PITTS-BURGH LOCKS MAY BE FORMED IN two operations—at one handling.

This is only one of thousands of jobs our machines are capable of producing which makes them the ideal machine for the sheet metal



800 Illustrations Malled without charge.

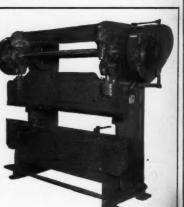
Built in sizes ranging from 14 gauge x 52" to 14 gauge x 78" and 10 gauge x 48", these machines are unequalled for CAPACITY — EFFICIENCY and ECONOMY.

It will pay you to Verson ALLSTEEL BRAKES as the so to consider KES as the solution of manufacturing problems.

Copy of Bulletin JP-103 will be mailed on request.

THE ALL STEEL PRESS CO. 12019 S. Peoria St.

Chicago, III.





SEN

ON LY

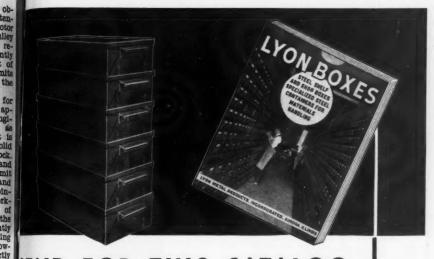
uts of he (3) Reduci This r

overs she

rock in p steel conta Send f n to you

facturing :

EQU



SEND FOR THIS CATALOG

ON LYON

reeautted nr-

STEEL BOXES

• Production Executives . . . Are you interested in: (1) Reducing st of handling materials; (2) Saving floor space in overcrowded production departments; 3) Reducing the investment and upkeep expense on your material handling equipment?

This new, illustrated catalog contains many suggestions for making such savings. It sures shelf boxes for storage of small parts; shop and tote boxes for transportation of with in process by truck or conveyor; stacking boxes, nesting boxes; suggestions on special tel containers designed for use with specific production systems.

Send for a copy of the catalog or ask a Lyon Salesman to call. We may be able to pass. m to you some benefits resulting from thirty-five years of experience in designing and manuheturing steel containers.

> LYON METAL PRODUCTS, INCORPORATED 1305 RIVER STREET, AURORA, ILLINOIS

LYON	
STORAGE Service	
LYON METAL PRODUCTS, INCORPORATED, Autora, III	

() Copy of New Box Catalog; () Steel Shelving; () Lockers; () Toolroom Equipment; () Folding Chairs; () Send Salesman. Name Address City..... State.....

) Steel

LYON METAL PRODUCTS, INC. 1305 River Street, Aurora, Illinois.

Turn Odd Corners Into Convenient Storage Space

UNDER BENCHES



AROUND POSTS



STACKRACKS lock together to form solid units of any size or shape, and so can be used under benchind machines, around posts—anywhere in your shop you want to keep parts and materials.

Every Box Is

Instantly Accessible

Your boxes slide into the patented STACKRACKS just as easily as the drawers in your office file. You get at any box in the pile without tugging or hauling—without moving any other box.



CUT	THE	COUPO	ON F	OR .	ACTI	ON

Stack!	oin Corp. roy St., Providence, R. I.
	d me information on STACKRACKS.
Name	ze of my boxes is
Firm	***************************************
Addre	38



faces hardened and ground, including the taper hole; spindles are special alloy steel, with phosphor bronze bearings, line bored and lapped to a perfect bearing and adjustable for wear; new double wall apron with self-oiling steel gears, and all gear shafts supported on both ends; a multiple disc friction clutch in apron; and so on.

The lathes can be equipped for mill-



Front View of Lathe with Door Opened to Show Driving Mechanism

ing, key way cutting, grinding, turning tapers, drawn-in collet chuck work, gear cutting, and so on, in tool room, manufacturing plant, and general machine shops. Most of these attachments may be purchased with the lathe or ordered later when needed. The substantial design assures permanent alignment of the headstock, tailstock, and other major units. Headstock, tailstock, and carriage are hand-scraped to the bed. The lathe bed is heavily constructed and reinforced by box braces its entire length. Has 3 V-ways and one flat way accurately planed and hand-scraped.

The lathes are built in both the quick change gear and standard change gear types. Quick change gear lathes are equipped with a quick change mechanism for cutting 48 right and left hand TI Pl

W. 193

Now, to equipm machin worker blocks?

HER

Mount
or troll
tools.
loads o
of phy
crane s

The Zipounds, accurate double 1 ... and Ask for 1

4535 W

H

uding alloy rings,

bearouble gears, both

ch in mill-

he

THERE'S NO PERCENTAGE IN THIS ANY MORE!

Now, your big job is production ... to get the most out of present equipment ... to keep men and machines busy. Why let skilled workers struggle with old chain blocks? The Zip-Lift is a modern machine tool accessory that pays for itself out of earnings.



HERE'S HOW THE ZIP-LIFT SAVES YOU MONEY!

Mount this small electric hoist on a hook, jib or trolley. Let it serve two or more machine tools. It makes a one-finger job of handling loads on and off the chuck, relieves workmen of physical effort, eliminates long waits for crane service, speeds up production.

The Zip-Lift handles loads of from 250 to 750 pounds, stops within a fraction of an inch for accurate positioning of work. It's double safe with double brakes. Easy to operate . . . easy to install . . . and its low price makes chain blocks obsolete. Ask for Bulletin H-2. Write the Harnischfeger Corp.

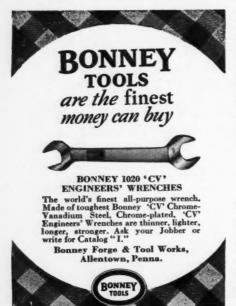
4535 West National Avenue, Milwaukee, Wisconsin

The ZIP-LIFT stops waste with



HARNISCHFEGER

HOISTS . ELECTRIC CRANES PAHD MOTORS . ARC WELDERS . EXCAVATORS



standard screw threads ranging from 2 to 112 per inch, including 11½-in. pipe thread. Standard change gear laths are equipped with a set of loose change gears for cutting right and left hand screw threads from 2 to 40 per inch, including 11½-in. pipe thread. The quick change gear lathe is popular in the manufacturing plant for tool room and production operations requiring frequent changes for threads and feeds. The standard change gear lathe is used in the machine shop, repair shop and manufacturing plant where the quick change feature is not necessary.

Whitney-Jensen 18-Ga. Bending Brake

The Whitney Metal Tool Company, Rockford, Illinois, announces the addition of a new 18-gauge Combination Bending Brake to their line of Whitney-Jensen Brakes. These brakes are available in 5-ft., 6-ft., 8-ft., and 10-ft. sizes and will handle any thickness of sheet metal up to 18 ga. A novel design feature enables the brake to be used for box and pan bending as well as all types of straight bending.

The Whitney-Jensen Brakes also include 4-ft. 20-ga. portable models and



Slip proof

SELF TIGHTENING

KNOCK-OUT

KEYLESS

chuck

Knock-Out ball bearing chucks are accurate heavy duty, and practically indestructible. Only a slight fingertip twist is required to hold drills as their action is self-energizing. Releasing drills is almost as effortless. Changing drills becomes a matter of seconds.

SEND FOR BULLETIN K37B

K. O. LEE & SON CO., Aberdeen, S. D.

May,

No. O

of wo will o

well-l powe overh insula porta

You other reque appli

M

Gr

ng



• With this portable Electric Screw Driver and Nut Runner, you can carry the tool to the job or the job to the tool. Wherever large numbers of wood or machine screws are to be driven or small nuts set, this tool will quickly pay for itself in time, effort and money saved.

It is a light, sturdy implement with top quality built into every part well-balanced, easy to handle and control. It is equipped with a powerful, smooth-running motor that will function indefinitely without overheating or requiring attention. Bearings, switches, motor and insulation are of latest improved types. A strong metal handle for portable use can be attached.

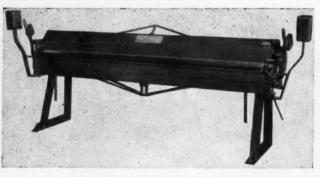
You will marvel at the efficiency and low operating cost of this and other Millers Falls fine electric tools. Write for descriptive catalog, or request a call by one of our motion engineers to suggest money-saving applications.

MILLERS FALLS COMPANY

Greenfield



Massachusetts



Whitney-Jensen 18-Ga. Bending Brake

heavier brakes of 16-ga. and 14-ga. capacity up to 10-ft. length. The new 18-ga. brake is an intermediate model which fits into the line between these other two types.

The outstanding construction feature of the new brake is the method of adapting it from plain bending to box bending. The upper jaw is clamped in four guide slots, two at each end, having locating offsets. By simply loosening the clamp nuts, the jaw can be

cammed up in these slots the correct position for box and pan bend-Attachable box fingers, available in various widths, can be clamped on the nose of the upper jaw for box and pan bending. The locating offsets in tue aus assure quick and easy positioning of the upper jaw assembly when changing over from one service to the other.

The upper and lower jaw assemblies are built up of welded steel plates in box section, with angle and truss stiffeners. The bending apron is of double welded steel plate design with a trus stiffener. On the hundreds of Whitney-Jensen Brakes now in use this construction has proved to be extremely accurate and durable. The lower jaw, on the 18-ga. brake, is fixed and the upper jaw is moved down to it by means of two counterweighted clamping han-

It's yours!

WILMINGTON VULCANIZED FIBRE has hundreds of uses for you. Tough, strong, light in weight, it is a perfect insulator against current, heat, shock, noise and vibration... yet machines quickly and easily. YOUR INQUIRY INVOLVES NO OBLIGATION.

WILMINGTON

FIBRE SPECIALTY COMPANY

Wilmington, Delaware

| DECIMAL | CONTAINTS | CONTAI

THIS handy, pocket-size Decimal Equivalent Chart willbe sent you, upon request and

without obligation. Write for yours — we'll mail it promptly.

(And, if you haven't your copy of our 32-page treatise on Fibre, ask for it, too. There's a free copy awaiting you.)

An

HE

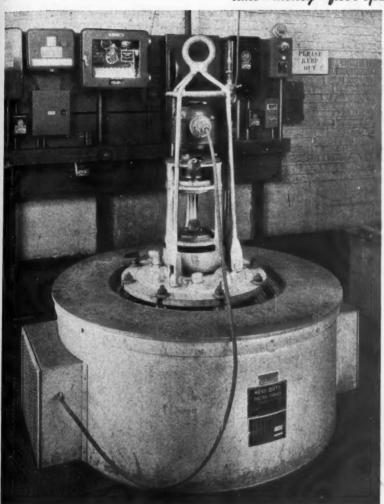
Electric Carburizing Saves

937

in

COTfor endble vailous be the pper and The in ure easy the emne the lies in tiffible uss eyonac-aw, the ans

time - money - floor space



An HD-1225 Hevi Duty Electric Vertical Retort Carburizing Furnace in the Plant of the Stewart-Warner Corporation, Chicago

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVER ELECTRIC EXCLUSIVELY
MILWAUKEE, WISCONSIN

BAUSH



UNIVERSAL JOINT

Baush Universal Joints have been on the market for years, but we have made improvements both in materials used and in construction. Consists of five pieces only and can be easily taken apart and reassembled. From 5/8" to 4" dia., in steel or bronze or steel with bronze center blocks. Maximum angle 36 deg.

Write for full information. BAUSH MACHINE TOOL CO. SPRINGFIELD, MASS. U. S. A.

For ALL Wheel Dressing **Operations**

The new EVER-SHARP DIA MOND TOOL is made with a long, natural shaped diamond requires no resetting-is adapted to ALL types of wheel dressing operations -economical - accurate.

WHEEL TRUEING TOOL CO., INC. 13931 OAKLAND AVE. DETROIT, MICH.

dles working through toggle connections which are adjustable for different metal thicknesses. The supporting legs are of welded steel tee sections, correctly plan-ned to support the weight of the mechanism against tipping. The nose of the upper jaw is properly polished to enable the brake to do good work on stainless steel and similar materials.

This new Whitney-Jensen Brake has been designed and built in response to a growing demand in the sheet metal trade for a brake of this size and ca-

pacity.

Carter No. GR7 Grinder

The R.L. Carter Division of the Stanley Works, New Britain, Conn., offers a Grinder, No. GR7, that has a multitude of uses with the application of different Carter attachments. It may be used free hand to grind dies, remove burns



Carter No. GR7 Grinder

on small metal parts, remove flashing on die castings and to carve wood. With a lathe holder, it may be used to true up lathe centers and for shallow internal and external grinding on work held in the lathe. With other attachments it may be used to grind small tools and to rout in wood or non-ferrous metals.

The machine is precision built. The 1/7 h.p. 18,000 r.p.m. universal motor operates on either D.C. or A.C. 60 cycles or less. It has large ball bearings, aluminum alloy housing and a 14-in

ions netal e of

lanechthe enon ls. has e to etal ca-

anude rent used urrs

ue



-nothing to it with LUFKIN MIKES

TRY TO SPLIT A HAIR 30 TIMES! This is the accuracy to which LUFKIN standard micrometers are made—measuring to within 1/10,000 of an inch. They speed up shop time, for the markings are clear and easy to read even to this accuracy.

LUFKIN micrometers save money in the long run, for they are built to last, and those who use them agree, one and all, they DO last. Mechanics know from experience that LUFKIN Mikes stand up on the job year after year. They are made in all sizes from 1 to 12 inch.

When you need a really good micrometer, step into your favorite hardware or tool store and ask them to show you a LUFKIN.

Write for Catalog No. 7.



PRECISION TOOLS-TAPES-RULES

SAGINAW, MICHIGAN

NEW YORK CITY

chuck that holds grinding points, drills, rotary files, arbors for wheels and Carter adapters for points with shanks as small as 1/16 in. The grinder is shipped packed in a wooden box with six grinding points, a tube of grease and

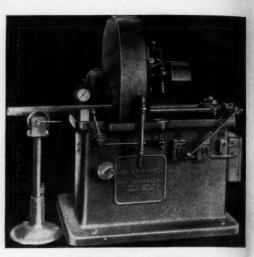
188

a wrench.

Campbell Cutamatic Machine

Those who are confronted with the problems of cutting materials economically will be interested in the announcement of the Campbell Cutamatic Machine, which has been placed on the market by the Andrew C. Campbell Division of the American Chain & Cable Company, Inc., Bridgeport, Conn. The outstanding features of the machine are that unannealed materials can be

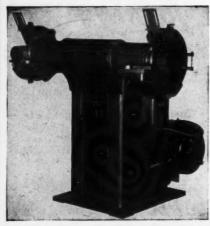
cut, stock is saved through the use of thinner abrasive cutting wheels, finished cuts are produced in a minimum of time, and abrasive wheel breakage is prevented by a new method of coolant application.



Campbell Cutamatic Machine

The Cutamatic operates upon what is said to be a new principle of abrasive cutting. The arc of contact remains constant in cutting any thickness of stock, this fact being accomplished by

GRINDERS and BUFFERS



• An unusually complete line from ½ to 20 HP. Bench, Pedestal, Standard & Special Widths, Combination Grinders & Buffers, Disc Grinders, Normal or Heavy Duty.

Built in "Motor in Head" or Selective Speed Designs. Self Contained Exhausters available.

A line designed to allow you to select the least investment for each application.

We also manufacture a complete line for the motorization of cone pulley machines.

Ouotations submitted promptly.

THE PRODUCTION EQUIPMENT CO.

5219 CHESTER AVE.

CLEVELAND, OHIO

uy,

From gene of "bikes"

change. A engaged is for fun", is sion of A that the m of bicycle

COL

Nothing he tion than it developed as the naithat grip to or longitud sure is relife for the

It's N

MO 401 5



n Industries That Build "For

from generation to generation, the popularity of "bikes" and roller skates has seen little dange. As a result, the principal companies mgaged in supplying these products "made for fun", have become a most substantial divition of American industry. It is significant that the majority of the leading manufacturers of bicycles and roller skates are constant users of MODERN PRODUCTS. They have found - as have 1800 other MODERN customers - that when screw machine repair parts and tools are needed, MODERN PROD-UCTS meet every requirement for dependable, efficient operation . . . for long life . . . for economy! You, too, will find that it ALWAYS pays to specify MODERN PRODUCTS.

COLLETS with A POSITIVE GRIP

Nothing has contributed more to the efficiency of collet operation than the MODERN COLLET Double Saw Tooth serrationdeveloped and furnished only by this company. This serration, s the name implies, presents a series of wide sharp surfaces that grip the stock so securely that all slipping, either radially or longitudinally, is entirely eliminated. Much less locking presure is required, which means a saving in power and longer life for the locking mechanism.

HAVE YOU A COPY . . . of our new Catalog No. 33? It's NEW from cover to cover. Write for it today!



COLLET & MACHINE

This "OLIVER" BAND SAW



Moto, on small Precision-built Operates from light socket

costs less to own!

It lasts longer, saws more smoothly, and never lets you down. Has all the refinements developed for larger "Oliver" Band Saws. Especially efficient sawing sheet steel. Also sprues of soft metal, hard rubber. compositions, woods. woods, etc. Rips to 11" wide. Cross-cuts nd miters up to 8". l'able tilts 45° to right. Precision-built in every detail.

> Write for details

OLIVER MACHINERY CO., Grand Rapids, Mich.

the combination of oscillating and rotating increments of the hydraulically fed abrasive cutting wheel. Through this combination of oscillating and retating movements, the machine produces smooth, accurate cuts on bars up to 6-in. diameter. The machine finishes as it cuts, thereby saving the cost of extra finishing operations. Burring is minimized and burning, surface harden-ing and glazing are said to be eliminated.

In some cases on high speed steel, savings amounting to one or two pounds per cut can be made due to the thin wheels used. The wheels are 10, 12, 14, 16, 18 and 20 in. in diameter and all are 3/32 in. thick except the 20-in. diameter, which are 1/8 in. thick.

An equal temperature on both sides of the abrasive wheel is maintained through an equal distribution of coolant on both sides of the wheel. This feature is important in maintaining a flat surface on the face of the wheel. While primarily designed for cutting solid by stock, the machine is just as effective on tubing of any wall thickness. By the Cutamatic method of applyi coolant, all grit and dust are wash of applying into the tank, keeping the air clean. Three material holder stands are furnished as standard equipment. The machine is powered by standard, squir-rel cage, ball bearing type motor, either 7½, 10 or 15 h.p.

The spindle speed is 2100 r.p.m., power being transmitted from the motor to the spindle through large multiple V-belts. The height of the machine is 72 in. and the floor space required is 61x65 in. Net weight, 3925 pounds.

HIGH SPEED SHEARING

Of Irregular Shapes

Ring and Circle Cutting

The ideal shear for sheet metal work—absolutely accurate absolutely accurate and easily operated . . metal is sheared and not punched . . . cut a n y w h e r e , no starting holes required for inside cutting . . . diustment only one adjustment for various thicknesses



LIBERT MACHINE CO. Manufacturers of shears since 1915



L-W 6x6-In. High Speed Power Saw

The illustration shows a 6x6-in, high speed power saw which has been placed on the market by L-W Chuck Company, 20 N. St. Clair St., Toledo, Ohio. The

GENERAL UTILITY PRECISION FLEXIBLE SHAFT MACHINE

Quantity Production makes this price possible!
Powerful air-cooled Universal motor. All metal Sheath—New Style Pencil Type Handoicec Chuck. Wt. 2 oz. All metal Sheath—New Style Fencil Type Handpiece Chuck. Wt. 2 oza. Easily reaches unhandy places. Six speed foot rheostat. Total Wt. 4 lbs. Fully Gusrant'd. 10-Day Money Back Trial. Send for Catalog 305S, showing over 800 Quick change Tools.

LINICK, GREEN A REED, INC.

28 E. Madison St Chicago, III.



PRECIS punishr

Short p retainer these P

any oth ball bea

NORM

nir-her

Its nd

W



WHERE service conditions are most severe—where loads are heaviest—where impact, momentary overloads, and vibration are a problem—there NORMA-HOFFMANN PRECISION ROLLER BEARINGS demonstrate their extraordinary ability to absorb punishment.

Short parallel roller design—the use of a heavy-duty, completely machined bronze retainer—extreme refinement of workmanship and finish—these factors combine to give these PRECISION Roller Bearings a lower coefficient of friction under heavy loads than any other type of ball or roller bearing, together with a speed-ability equal to that of any ball bearing, size for size. Write for the Catalog. Let our engineers work with you.

ndrma-hdffmann

PRECISION BALL, ROLLER and THRUST BEARINGS

NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN., U. S. A.

machine will cut material up to 6x6 in. in size, operating with blades which can be from 10 to 14 in. in length. The



L-W 6 x 6-In. High Speed Power Saw

saw frame is so designed that maximum rigidity is obtained. The sliding bearing is dovetailed to fit the arm and is adjustable in all directions.

adjustable in all directions.

The feature of the machine is the automatic relieving device, the saw blade automatically lifting on the reverse

stroke so as to save the teeth. An automatic trip is provided which stops to machine at the completion of the cut. The coolant pump is mounted inside the base, making the machine entirely self-contained. The speed of the pulley a 120 r.p.m. Weight, crated, 460 pounds.

G-E "Thermo-Tector" for Fractional HP Motors

A new thermal overload switch for fractional horsepower motors, operating on line current and arranged for convenient mounting on the conduit of terminal box of the motor, has recently been placed on the market by the General Electric Company, Schenectady, N. Y. It is completely self-contained and has no links or plugs to be replaced.

has no links or plugs to be replaced. Known as the "thermo-tector," the device automatically disconnects the metor from the line, when an overload occurs, before the motor reaches a dangerous temperature. Then, when the motor has cooled, it is automatically reconnected to the line, the entire operation being repeated at a safe interval until the motor is freed of overload or is removed from the line.

Where the automatic-reset feature is not required, a form of the new switch



DEPENDABLE LINE GETS RESULTS



is available which can be used to disconnect the motor from the line and leave it disconnected until the device is manually reset.

The elements of the switch consist of a thermostatic bimetallic helix, a heater helix, a flat steel spring, and a contact arm. The bimetallic helix is fixed at one end. The opposite end carries a slotted arm which rotates about one support of the spring. A low-resistance heater, which is connected in series with the motor winding and which carries the motor current, completely surrounds the bimetallic helix. This heater element is welded in place and is tamperproof. The

H. O. BATES INTRODUCES

flat steel spring is mounted between two rigid supports in such a manner that it is slightly bowed. This bowed spring carries a contact arm which makes contact when the spring is bowed in one



G. E. Thermo-Tector mounted on terminal but of fractional horsepower motor

SMALLEST STRONG, HAND NUMBERING MACHINE MADE

STAMPS SIX 1/8" FIGURES WITHIN 1/2" LEFT TO RIGHT SPACE.

Six 1/32" Figures within 3%" Left to Right Space. For Numbering Keys, Watches, Small Parts, Name Plates, etc.

Write for circulars and prices

H. O. Bates MARKING DEVICES

966 CARTERET AVE., UNION, N. J.

NEW YORK OFFICE-68 BARCLAY ST.

direction, but which opens the circuit when it is bowed in the other direction. When the bimetallic helix is heated to a temperature above normal, the free end rotates and reverses the bow of the

to a temperature above normal, the nee and rotates and reverses the bow of the spring. When the spring passes dead center, it also moves the contact am and disconnects the motor from the line. With the line open, current ceases to flow in the heater helix, the bimetallic helix turns in the opposite direction, and when the temperature is again normal, the spring snaps to the "on" position.

The Thermo-Tector is available in ratings for a-c fractional horsepower motor having rated full-load currents from 13 to 10.4 amperes.

Mention MODERN MACHINE SHOP when writing to advertisers.

USE THE PATENTED

ZIEGLER

FLOATING TOOL HOLDER
WHEN

TAPPING—REAMING— COUNTER BORING— DIE HEAD FLOATING—

W. M. Ziegler Tool Co. 511 LEIB ST. DETROIT, MICH.

CORRECT misalignment of machine spindle with the work. REDUCE set-up time, also cost of broken cutting tools. ELIMINATE scrapping of parts due to beli-mouthed or over-sized holes caused by faulty alignment.





Skilsaw Slow-Speed Drills

Two new important additions to the well known line of Skilsaw Ball Bearing Electric Drills are being announced by the manufacturers, Skilsaw, Inc., of Chicago, Illinois.

The new 1/4-in. and 1/2-in. Slow-Speed,



High Torque Skilsaw Drills have been developed particularly for drilling in steels of high nickel content,—such as Monel and Allegheny metals, stainless steel, etc. The slow speed of these new tools lengthens materially the life of twist drills, eliminating the need for fre-quent sharpening. Drilling speed, however, is not sacrificed because the high torque feature makes it impossible to stall the drills at maximum drilling ca-

for Smooth Running

BEARINGS

Dependable bearings are the rule with Abbott Balls in the race. Write for test samples. Surface, tolerance, structure will meet your standards-please your customers.

THE ABBOTT BALL COMPANY 1056 New Britain Avenue Hartford, Connecticut

BEARING BALLS

pacities. The ½-in. model is particularly interesting because its design is new for a drill of this capacity. Its one-hand grip feature makes it ideal for close quarter work and for use with hole saws in places impossible to reach with side-handle drills.

Both models are available in speeds of 350, 450, 600 and 750 r.p.m. Their slow speed makes them especially adaptable to wood boring. Smoothness of operation is assured by ball bearings on arma-ture and spindle. Aluminum alloy bodies give strength, durability, and light weight. The 1/4-in. drill is 14 in. long, and weighs only 6½ lbs. The ½-in drill is 14½ in. long and weighs only 8 pounds.

Bruning Printer for Exposing Black and White (Black-Line)

A simple, compact, continuous printer, scientifically designed for exposing BW black-line paper or blue print paper, is announced by Charles Bruning Company, Inc., 102 Reade Street, New York, N. Y. The machine, which is built for 100 A.C. and 110 D.C., exposes paper of any width up to and including 42 inches. It plus into any light socket and consumer

SPECIFY ALLIGAT



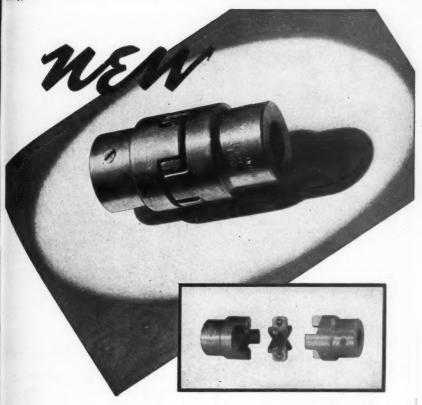
Speed up production . right file for the job will save time and money. Alligator Brand Files are available in a complete line of American and Swiss Patterns in all shapes, sizes and cuts to fit every filing need. Passing the highest tests, as to shapes, cutting quality and uniform hardness. they are guaranteed perfect in every detail. Write for catalog and prices.

CARSON-NEWT

937 ticun is onefor hole with is of slow table eramaodles light long, only

lack

nter BW any, A.C. idth ımes

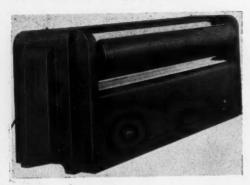


THIS NEW Boston Ball Bearing Type

Flexible Coupling is equipped with an insert having hardened and ground balls, similar to those used in ball bearings. When operating, these balls come in contact with hardened and ground jaw surfaces. The greater flexibility of this coupling over the ordinary jaw coupling removes the strain between motor and machine and permits unrestricted end play of motor shaft.

FOR COMPLETE INFORMATION ASK US FOR FOLDER No. 7-36

BOSTON GEAR WORKS, INC. NORTH QUINCY, MASS.



Bruning Printer for Black and White Prints

the minimum of current.

Used in conjunction with the Bruning Black and White Developing Machine, the new Bruning BW Printer provides a simple, inexpensive means of producing black-line prints from tracings or drawings. After the paper has been exposed in the new BW Printer, the print is developed instantaneously in any regular BW Developing Machine and is immediately ready for use. The prints need

no washing or drying.

According to officials of the Charles Bruning Company, a single operator, using the new BW Printer with average tracing on cloth, can easily print and develop two to three 50-yard rolls of black-line paper per day.

Mathews Shock-Absorbing Roller Conveyor

To meet the conditions set up by modern industry and the tart placed by these conditions on roller conveyor systems, Mathews Conveyor Company, Ellwood City, Pa., has developed a shock-absorbing, resiliency mounted roller conveyor. The constantly increasing demands on roller conveyon have necessitated the construction of

have necessitated the construction of conveyors of heavier design, which theoretically would take care of the task. However, actual tests have proved conclusively that loads are of uneverweights and skids are often distorted with the result that a load, instead of being distributed over a number of rollers, may be carried by only two or three rollers with the result that these rollers support many times the load theoretically calculated. This unevent





the



WHEN you use Carborundum Brand Mounted Wheels in your high speed grinders you can be assured of the right abrasive in the right grit with the right bond in the correct degree of hardness in just the right shape to handle the operation in the

CARBORUNDUM

PRODUCTS

ABRASIVE

most effective manner.

Of the many shapes developed by The Carborundum Company over a period of years, to meet the manifold demands of industry, a few of the most popular have been assembled in a "Utility Set." This set is comprised of shapes that have proved eminently satisfactory on 90% of all high speed grinder applications.

Try this set and note its widespread usefulness.

Other shapes are immediately available from stock. Send for complete catalog showing these various ahapes—full size.

THE CARBORUNDUM COMPANY . NIAGARA FALLS, N.Y.

Utility Set No. 824 W

Sales Offices and Warehouses in New York, Chicago, Boston, Philadelphia, Cievenand, Detrois, Cincinnati, Pittsburgh, Grand Rapids. (Carborundum is a registered trade-mark of The Carborundum Co.)

CC



AUTOMATICALLY SHARPENS METAL SAWS IN GANGS

Up to 51/2" diameter and up to 13/4" thickness. 100 SAWS OF 26 GAUGE CAN BE SHARP. ENED AT ONE TIME.

The saws are automatically indexed and sharp-ened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR

THE WARDWELL MFG. CO.

CLEVELAND, O. 3166 FULTON RD.



Mathews Shock-Absorbing Resiliently Mounted Rollers in a Typical Roller Conveyer

distribution of the load and overloading of rollers has been reflected in the maintenance costs of the conveyors which in certain cases have reached a nearly prohibitive point. The problem thus has resolved itself into that of finding some means of causing each roller to carry its proportionate share of the load.

The Mathews Shock-Absorbing Roller

GRANT RIVETERS

Pioneers in the riveting field. Head rivets from smallest to %" diameter, either by noiseless spinning or vibrating hammer method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

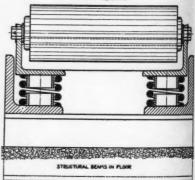
Multiple Spindles.

Write for literature—and don't forget to send samples.

THE-GRANT MFG. & MACHINE CO.

96 Silliman Avenue Bridgeport, Conn.





Drawing showing construction of Mathews Shock-Absorbing Resiliently Mounted Reller Conveyor.

Conveyor is mounted on heavy springs mounted on L-beams which are, in turn, mounted on heavier springs on still heavier L-beams which are solidly supported. For example, the Type 53 conveyor roller is 2-9/16-in. diameter and is mounted in 3x3x5/16 L-beams Elir mer

aute Hewitt me tail-reveali response es mized, and

fag caused Cooper I light" for thirty years to the mer resembles d

perception Thirty ye mendation Lamp Com

you. For de Lamp Com the fors i a lem

are

ller

11y 53

COOPER HEWITT ENGINEERED LIGHTING

See Details Quickly by Banishing Glare

Eliminate time lost by your workers in the mere physical act of "seeing" . . . and you automatically speed up production. Cooper Hewitt mercury lamps provide industry with detail-revealing, restful light that makes quick visual response easy. Errors that lead to rejects are minimized, and workers lose no time due to end-of-shift fag caused by eye fatigue.

Cooper Hewitt light has been "better than daylight" for industrial applications for more than
thirty years. By adding Mazda incandescent lamps
to the mercury, lighting is obtained that closely
reembles daylight values for operations that require
perception of color.

Thirty years of experience is behind every recommendation on lighting when General Electric Vapor Lamp Company engineers survey your plant with you. For details address the General Electric Vapor Lamp Company, 897 Adams Street, Hoboken, N. J.



No end-of-shift fag for this worker. The illumination overhead is Cooper Hewitt mercury combined with Mazda incandescent lamps.





For use where color is of important



COOPER

STANDARD

GENERAL ELECTRIC VAPOR LAMP COMPANY

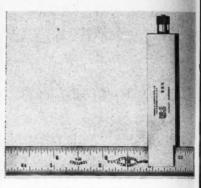
May. 1

supported by 2½ O.D.x% in. coil springs on 3½x3½x½ L-beams. From actual tests and six months' constant use, it has conclusively been determined that this resiliency in the roller mountings permits each roller under a given load to carry its proportionate share of the load. Bearing friction is reduced to normal. The result of this is that the coefficient of friction used to calculate the effort required to move loads over a roller conveyor of this type has been reduced considerably. In testing the conveyor referred to, conditions were set up to duplicate certain conditions which have been found in actual practice, such

as the lowering of a crane magnet onto a load on a roller conveyor, thus adding the weight of the magnet to the load temporarily and heavily overloading the rollers. Again, heavy loads were dropped on the resiliently mounted conveyor rollers, subsequent inspection disclosing that the springs absorb the shock and prevent injuries to the rollers or their bearings.

B & S No. 555 Adjustable Square

The Brown & Sharpe Mfg. Co., Providence, R. I., has recently announced an Adjustable Square No. 555 having a blade 4 in. long. The square is particu-



B & S No. 555 Adjustable Square

larly useful to toolmakers and other users requiring an adjustable square with the capacity which a 4-in. blade allows. Its larger size makes it suitable for many classes of work which adjust-able squares with a shorter blade cannot accommodate. The tempered blade is 4 in. long and the beam is 2 7/16 in. long, hardened and ground.



BALL THRUST BEARINGS

Special Bearings Made to Order. Any quantity.
"One Bearing or One Thousand"

Your present bearings duplicated. Send sketch or worn sample, regardless of condition, for quotation.

Catalog Upon Request

THE GWILLIAM CO. 358 Furman St., Brooklyn, N. Y.

STA-KOOL

The New Diamond Holder Save diamond cost with this new improved fin type, air and water cooled diamond holder. Consists of a series of fins per-

greater efficiency in the dissipation of heat.

mitting greater radiation and consequently Tool protected by U. S. Patent No. 2047147.

Send for complete details and prices.

J. K. SMIT & SONS, INC., 157 CHAMBERS ST., NEW YORK

Turning a Vascoloy-1 3/16" 24

Tool Vasco

High S

Gi

More pic ing cost variable is put o No won hard allo ceptance terial, i and in si

strength Ramet a of mach

Produced different

ding load

the

het

are

ovil an g a icu-

her

are

ade

18t-

an-

ade

in.



VASCOLOYRAMET BLANKS
Vascoloy-Ramet is
available in three
forms, (a) completely finished
tools, (b) milled
and brazed tools,
and (e) blanks.
V-R blanks are
furnished in 5
standard styles
and in sizes to
meet every requirement. To make
tools with V-R
blanks is a simple
operation, fully
described in a new
instruction booklet, available free

-upon request.

Turning a 2½" step face on 22½" diameter forging. Material-S.A.E. 3135 as forged.
Fatcoloy-Ramet Tool Grade D, 1½" x 1½", style 3, with chip breaker 3/64" x
1/16" parallel to side cutting edge angle, 10° side rake. Comparative performance:

Tool Material	Depth of Cut	Feed per Revolution	Feet per minute	Pieces Per Grind
Vascoloy-Ramet Grade D	3/16" to 1/4"	.014"	220	95
High Speed Steel	3/6"	.014"	821/2	5

More pieces per grind—faster time from floor to floor—lowered machining costs! This is the almost invariable result when Vascoloy-Ramet is put on test.

s put on test.

No wonder this tantalum carbide hard alloy is winning such rapid acceptance as the preferred tool material, in great industrial plants and in small machine shops, as well. Produced in 17 standard grades, of different tantalum-carbide content, strength and hardness, Vascoloy-Ramet alone covers the entire range of machinable materials.

Unrivalled in the machining of all steels from the softest to the hardest alloys, Vascoloy-Ramet alone is proof against "cratering." On cast iron, semi-steel, non-ferrous metals and materials, its performance is exceptional.

The new catalog-price list of Vascoloy-Ramet tools and blanks will be sent promptly on request.

VANADIUM-ALLOYS STEEL CO. Vascoloy-Ramet Division, North Chicago, Ill.

VASCOLOY-RAMET

.. The TANTALUM CARBIDE TOOL MATERIAL ...



A GRADE FOR EVERY USE

DISTRICT SALES OFFICES

SALES OFFICES:
PittsburghPa.
New YorkN. Y.
BostonMass.
Springfield Mass.
ProvidenceR. I.
Cincinnati Ohio
ClevelandOhio
DetroitMich.
ChicagoIll.
St. Louis Mo.
BuffaloN. Y.
PhiladelphiaPa.
NewarkN. J.
Knoxville Tenn.
Los AngelesCal.
San Francisco Cal.



Mattison No. 453 Wide Belt Sheet Grinder

Mattison No. 453 Wide Belt Sheet Grinder

The Mattison No. 453 Wide Belt Sheet Grinder, shown in the illustration, product of Mattison Machine Works, Rockford, Ill., is specially designed for the proper application of factory coated abrasive belts to the grinding of stain-less steel and other alloy sheets. It is built with precision and care, and has the necessary weight to assure the stability necessary for smooth surfacing.

In addition to producing a fine uniform finish, the Mattison No. 453 Wide Belt Sheet Grinder has been designed with the particular object of securing the highest efficiency and longest life from factory coated abrasives. Construction adapts itself for quick application of belts. Push button station and con-trols for table are located at the front of the machine for easy access by the operator. Contact rolls are removable and rolls of any degree of cushion may be easily substituted according to the nature of the work.

The grinder can be furnished in various widths and lengths. The illustration shows a machine made to carry belts 50 in. wide to grind sheets 48 in. wide by 14 ft. long.



• Press operators report safe operations by using Triple Interlock Junkin Safety Guards which lock presses until guards are safe. Install Junkin Safety Guards on your presses for safety, economy and efficiency. Recommended for all types of inclinable and small presses. Literature sent upon request. State size and type of press.

JUNKIN SAFETY APPLIANCE CO. 930-936 W. HIII St. Louisville, Ky.



WALTHAM THREAD MILLER

Let us explain why this machine is largely used for special taps, single and multiple worms, etc., in tool rooms and factories.

WALTHAM WORKS MACHINE WALTHAM, MASS.

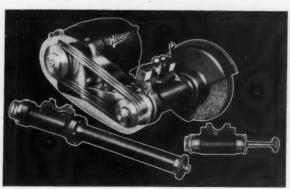
May,

Catal on

life uction on-

the ble nay the

rarry in



U. S. Pat. 1953133 "None other just as good"

205

PRECISION GRINDERS!

Up to 10 H. P.
INTERNAL or EXTERNAL

NEW!
Catalog No. 50
on request!

No need to baby these husky, powerful Grinders. From 1/4 to 10 H. P. with constant speed Motors these Grinders afford a steady uniform grind under any load within their rated capacity. This is in direct contrast to a Universal Motor powered tool. They are readily adapted to lathe, planer, boring mill, shaper, etc. for any cylindrical, internal or surface grinding job.

Internal and External Grinding Heads are interchangeable. Precision Ball Bearings are used throughout requiring no adjustment throughout entire life.

THE HISEY-WOLF MACHINE CO.

"It's High Grade If Hisey Made"



Established 1896 CINCINNATI, OHIO, U.S.A.

Electric DEILLS

GRINDLES

RULLERS

Mill Supply Men

Attention! The above is only one of many "HISEY" Electric Tools sold all over the Country by Mill Supply Houses. Let us outline our Sales Policy covering the most complete line of Quality Electric Drills, Grinders and Buffers,

Progressive Hydraulic Spot Welding Gun

The illustration shows the compact portable welding gun which has been developed by the Progressive Welder Company, 739 Piquette Ave., Detroit, Mich., for sheet metal fabrication. The gun is small and easy to manipulate, due to the few parts involved. The upper pressure bar acts both as a conductor bar and back up bar, simplifying the construction. The lower bar is the other lead to the transformer and also serves to locate and position the

work. The gun is particularly intended for welding automobile bodies, radiator shells, steel truck bodies or other transportation units, or any other products in which the fabrication of sheet metal is involved.

The hydraulic action provides an ab-



Progressive Hydraulic Spot Welding Gun

50 Times Longer Life at These Points You know about Carboloy's ability to resist abrasive wear on lathe and grinder centers, centerless grinder rests, wire drawing dies, etc. Now-you can use Carboloy to tip your micrometers at their point of wear-give them at least 50 times longer life, and increase their degree of accuracy during this entire period of greater use. Send us your micrometer. We do the rest. Write for descriptive leaflet.

CARBOLOY COMPANY, INC. 2975 E. Jefferson Ave., Detroit, Mich.

CARBOLOY TIPPED ANVILS

solutely constant pressure against the parts to be welded; when the trigger is pressed, the correct amount of pressure is first built up and then the welding cycle is completed. The hydraulic operation provides the same pressure on all welds. This pressure, combined with automatic timing and heat control, insures the maximum results.

The unit can be installed on any production line, connections to air, water and electrical supply only being necessary. Mounted on a swiveling hanger, the gun provides a working position on

QUICK-LOADING STOCK REELS

SINGLE AND DOUBLE

For use with automatic machines and punch presses with feeds. **Also reels for wire.**

S & S MACHINE WORKS

4541 W. LAKE STREET . . . CHICAGO. ILLINOIS



64

led tor ngtal ab-

he

1-

0-



et this

NEW CATALOG of BRONZE BEARINGS

You will welcome the handy, valuable information to be found in the new Catalog 137.

This booklet contains complete figures and facts for ordering and specifying Cast Phosphor Bronze Bearings.

Rigid inspection and the most modern methods of manufacture, developed over 35 years of experience in this field, are your assurance of uniform high quality in all BUCKEYE products.

Write today for your copy of the NEW CATALOG 137.

BUCKEYE BRASS & MFG. COMPANY 6410 HAWTHORNE AVE.,

CLEVELAND, OHIO

any point in approximately a 12-ft. radius and as high as the operator can reach. The light weight of the gun makes a balancer unnecessary in many cases. The transformer, completely water cooled and constructed of the highest grade materials, will not heat up under long periods of continuous operation. A hand operated switch provides heat variations for the different gauges of materials.

The heart of the unit, which is the hydraulic booster, is mounted on the back of the transformer. This booster provides a working pressure from 0 to

3000 lbs., the pressure required being obtained through a "finger-tip control" adjustable valve. The patented short-proof water-cooled cables are extremely flexible.

The hydraulic welding gun is available in three types; expansion, pincher and fixture bar type, with a wide variety of points, adapters and yokes to accommodate the most intricate shapes or sections. The guns are of very rugged construction and withstand rough usage and handling. Operation of the gun is extremely simple.

Knock-Out Grinding Wheel Dresser

The illustration shows an abrasive dresser for grinding wheels which has been placed on the market by K. O. Lee & Son Co., Aberdeen, S. D. The



Knock-Out Grinding Wheel Dresser

dresser is intended to fill the gap between a diamond and the conventional star type of dresser. Being a hand tool, it is handy and quick to operate, but is said to produce a very fine surface on a grinding wheel. It is said that excellent results are obtained and without applying any particular pressure to the contact of the dresser with the wheel.

The dresser comprises an abrasive cutting wheel which is held at an angle to the grinding wheel, thereby causing a very rapid abrasive action. The dresser can be used for form wheel dressing where special shapes are to be ground, this dressing being done free hand and without the need of a special cam.

"Stark",

"ELECTROBLAST"

High Speed Heat in 20 Minutes



Powerful torch used separately as a very handy portable flame, \$35. High Speed Muffle Furnace, no scaling or decarburization, reaches high speed heat in 20 minutes at 70 per hour; quickly saves its cost. Muffle 7"x3 %"x2 %", \$35. Also a larger furnace with built-in torch, muffle 7"x4 %"x3 ½".

STARK TOOL CO.

Originators of the American Bench Lathe Est. 1862 WALTHAM, MASS.

SMALL SELF - LOCKING DRIVE PINS



Improve your assembly and cut your costs in half by replacing small taper pins, straight or cotter pins, keys and rivets with this new fastening pin.

Use straight drilled holes, no tapping or reaming. Diameters 1/32" to 1/8". Length up to 11/4".

THE DRIV - LOK CO., INC.

1525 RAILROAD AVE.

BRIDGEPORT, CONN.



May, 1

1

We is a fast

The and tap skill is will to

To s

The —Speed pround

96 J

trol" lortmely

cher variaces or gged

n is

sive

has O. The

onal ool, but see hat

thto

the

ive

gle

ing nd.

Etter - Emrick

HIGH SPEED - HIGH PRODUCTION

SMALL TAPPING

A NEW

Gravity Feed

TAPPING MACHINE

We cannot too strongly emphasize that this is a faster and more scientific means for small tapping than any other method.

The operator simply moves the foot treadle and tapping takes care of itself by gravity. No skill is required and no effort other than the will to move the balanced leg.

It all adds up to better and faster tapped holes.

To shorten the argument, we'll send the machine on trial to responsible firms.

The capacity is from 1/16" to 3/8" taps.
—Speed 900 to 2100 R. P. M.—The price around \$200.00.

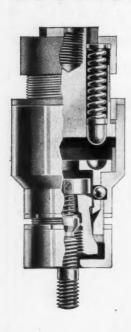
ETTCO TOOL CO.

596 JOHNSON AVE., BROOKLYN, N. Y.



Ask for Bulletin No. 4

TITAN



STUD SETTER

CONTROLLED DRIVE Assures Perfect Setting

The new Titan Stud Setter has a safety clutch which controls driving power.

The drive is automatically released when the studs reach a specified tightness and the tool may be removed without fear of mutilating or distorting the threads.

You get PERFECT stud-setting with the Titan.

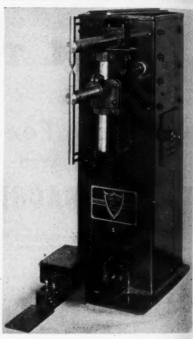
The speed range, utility, capacity and safety of the Titan Stud Setter make this production tool an economical necessity in your shop.

Write for new circular.

TITAN TOOL COMPANY

Taylor-Hall Spot Welder

Illustrated is a new type of spot welder now being marketed by the Taylor-Hall Welding Corporation, Worcester, Mass. The machine has several outstanding features, one of which consists in that the upper electrode moves in a vertical plane and not on the arc of a



Taylor-Hall Spot Welder

circle. This feature insures accurate and easy alignment of the electrodes and permits the making of two welds (up to the capacity of the machine) simultaneously.

The transformer and upper horn assembly are used as the pressure unit with an easily adjustable counter weight for light and medium heavy work. This design obviates the use of a spring for pressure and at the same time develops the maximum available pressure.

The foot treadle leverage is 3½ to 1, so that even though greater pressure is available, less manual effort is necessary. A new design of rocking step plate located on the end of the treadle operates the switch. This design re-

May,

co

Faced ing a sell at afford, in a Par gineer a work. N Kalon I Screws, ing the them. U from exening meaning of the saving of the

Eight di enings to and bet resulting flected, ative, in

Today,
"know"

4

spot the

out-

n a

les

ds

e)

6-

er vy of

p le

COMMAND to univex Engineers

"PRODUCE A FINE PROJECTOR -ANYONE CAN AFFORD"

A REPORT

from a
from a
parker.Kalon

parker.Maly

Assembly

Engineer

"I was called in by Mr. Kende, Chief Engineer at Universal Camera Corp., to make recommendations on their new Projector. After studying their fastening problem I made the suggestions covered in this report."

RESULT
Important
Assembly
Economies
Conomprised
Only 8 mm
Univex 8 mm
Projectors

FACED WITH the job of designing a fine movie projector, to sell at a price anyone could aford, Univex Engineers called in a Parker-Kalon Assembly Engineer at an early stage of the work. Not to learn about Parker-Kalon Hardened Self-tapping Screws, but to be certain of making the fullest possible use of them. Univex engineers knew from experience that every fast-

ening made with a Self-tapping Screw meant a saving of time, labor and money. And greater security, too.

Eight different assembly jobs, involving 23 fastenings to die cast parts were made much simpler and better through this wise approach. The resulting assembly cost reduction is clearly reflected, with other examples of design initiative, in the low-price of the Univex machine. Today, most design and production men "know" Parker-Kalon Hardened Self-tapping Screws and use them to some extent for making fastenings to metal and plastics. In 7 out of 10 cases, however, the specialized knowledge of a Parker-Kalon Assembly Engineer would help them effect greater savings. Any design or production head can have this help merely by asking us for it. It will pay you to get it for your present production, and whenever you face a new design job.

PARKER-KALON CORPORATION Dept. M, 198 Varick Street New York, N. Y.

PARKER-KALON Modern FASTENING DEVICES

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

duces the necessary foot movement to the minimum and allows the welder to be operated at extremely high speeds.

A turnbuckle adjustment for foot treadle height is provided so that when flat stock without flanges is being welded, the movement of the upper elec-trode need only be sufficient to release the work. Ease of operation, rigidity and long life of moving parts are as-sured by the use of grease filled and sealed roller bearings front and back and long guides bearing against oil impregnated maple wood gibs on each side. The weld is made as the foot is raised, which design is said to eliminate pounding at high speeds.



Improved Davey Portable Balancing Equipment

Improved Davey Portable **Balancing Equipment**

The Electrocon Corporation, 6 Varick Street, New York, N. Y., announces several improvements in the design of the Davey Portable Balancing Equipment. The illustration shows the complete equipment for power plants. This is

suitable for the balancing of large turbines and also for auxiliary machines such as fans, exhausters, pumps and motors. In addition, the photographic feature of the "two-direction" vibrometer enables records of turbine vibration to be made periodically, which is often the means of discovering troubles before they become serious.

ASK ANY

TAPPING ATTACHMENT **OPERATOR**

WHY HE PREFERS THE NEW

ru-Gr TAP HOLDE

FURNISHED ON "PROCUNIER" STYLE "E" HIGH SPEED TAPPING HEADS

He will tell you-"The extreme smallness and lightness in weight permits more sensitive tapping at high speeds—increasing production. Eliminates inertia set up by the ordinary heavy tap holders—saving tap breakage."

Send for Folder

PROCUNIER SAFETY CHUCK CO. 12 SO. CLINTON ST.

CHICAGO, ILL.

O you flat arbon? A exacting? We specia product to ments...an

May, 19

Our steel

fying custo

ticular abou



HARD-TO-PLEASE BUYERS of Flat Wire

Do you use cold-rolled steel flat wire...high or low orbon? Are your specifications cacting?

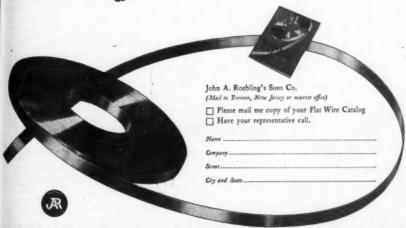
We specialize in making this product to meet exacting requirements...and are completely satisfing customers who are very paricular about the flat wire they buy. Our steel is made in our own mill...in special, small openhearth furnaces which permit exceptionally close control of the melt. Our organization is trained to handle difficult specifications requiring close attention and careful "follow-through".

We would be glad to receive your inquiry for further information, prices, or samples. Types:—Roebling Cold Rolled Flat Wire is made from both high carbon and low carbon steels, produced in Roebling's own mills. The high carbon flat wire is available in tempered and untempered types.

Finishes: — bright, black annealed, bright annealed, tinned, galvanized, blued, straw-colored, coppered.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. Branches in Principal Cities

Roebling COLD ROLLED STEEL FLAT WIRE



INLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING

The Model-S2 vibrometer, which measures in two directions simultaneously and also indicates wave form, is shown at the right of the illustration and the "single-direction" model-1 vibrometer is in the center. These two vibrometers may be used interchangeably. The Model-3 stroboscopic lamp with three neon tubes is shown at the left.

In the left foreground, the breaker head and phase adjuster is shown coupled to the synchronous motor unit. This synchronous motor unit is a new feature used for balancing 60-cycle machines running at 3600, 1800 or 1200 r.p.m. By its use, it is unnecessary to couple the breaker head to the shaft of the machine and the motor and breaker head may be placed at any point most convenient to the operator. For machines running at other speeds, the breaker head is driven from the end of the shaft by a tachometer point.

The Model-S2 vibrometer has been the

The Model-S2 vibrometer has been the subject of several improvements which make it more convenient to operate. Where maximum portability is required, a balancing equipment with single neon

lamp is available.

Carboloy Micrometer Tipping Service

Carboloy Company, Inc., manufacturers of cemented carbides, announces a special micrometer tipping service available to all micrometer users. By means of this service the micrometer user sends

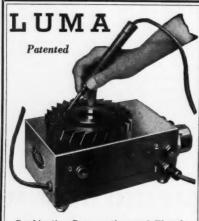


Micrometer Tipped with Carboloy

his micrometer to Carboloy Company who tips with Carboloy cemented carbides the wear points at the ends of the anvil and spindle. The micrometer is then accurately adjusted and returned to the owner, ready for immediate use. It is stated that the micrometers will

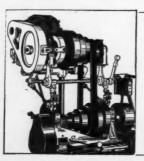
It is stated that the micrometers will hold to a closer degree of accuracy during a period of use that averages at least 50 times longer life than with regular steel micrometers without Carboloy tips.

Formerly, Carboloy tips were applied



Combination Demagnetizer and Electric Etching Pencil. Marks symbols in hardest steel. Demagnetizes instantly. One of our models popular in tool rooms for 15 years.

Luma Electric Equipment Co. DEPT. MS TOLEDO, OHIO



MOTORIZE . . boost output!

A Remco user writes . . "another important feature of Remco Drives is that greater production can be had due to the convenient arrangements for keeping the belt tight and the machines at their production peak" . Install Remco Drives in your plant if you want more output, lower power-costs, increased safety, reduced noise, rent-saving from a more compact shop layout. Write! Manley Products Corp., State & Hay Sts., York, Pa.

REMCO MOTOR DRIVES

May, 1

Sock Weig Notic Com allow wren See diffe

> Writ form and "UN locke ily.

> Sock

S

298

y to ft of

eaker most

ma-

the

d of

the

hich

rate.

ired.

neon

g

tur-

28 8 vaileans ends

87-

ter led ill ır-

g.

ed

)) for COMPACT DESIGNS "UNBRAKO" The Knurled Socket Head Cap Screw makes possible a decided saving in Clearance, Material,

Weight and Cost.

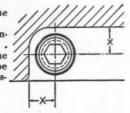
Notice how close to the corner the "UNBRAKO" is placed, in the diagram. Compare with the placement of ordinary screws which require setting back to allow for hex head and

wrench.

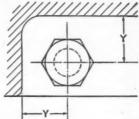
See - and save - the difference!

Write for complete information and prices . . . and ask, too, how the

can be "UNBRAKO" locked, quickly and eas- / ily. No obligation.



how the Knurled "Unbrako" snuggles right into the corner.



Notice the great open spaces necessary for the hex head and



KNURLED Socket Head Cap Screw

TANDARD PRESSED STEEL CO. JENKINTOWN, PENNA.

BOX 556

BRANCHES

BOSTON

DETROIT INDIANAPOLIS

BRANCHES CHICAGO

ST. LOUIS SAN FRANCISCO



Other **PUTNAM Tools:** Reamers Counterbores Special Tools

HIGH-SPEED

CUT FASTER-

LAST LONGER

Precision Tools for Modern Production

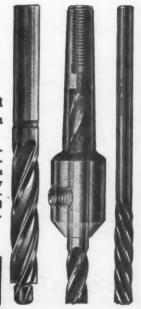
Warranted as to quality of material and workmanship, PUT-NAM "Hi-Speed" cutting tools are recognized as a standard for accurate and economical per-Our engineers will gladly aid in solving your cutting problems.

Write for CATALOG No. 3

AM TOOL

2981 CHARLEVOIX AVE.

DETROIT, MICH.

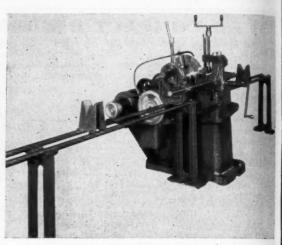


principally on micrometers used as "masters" to check other gages. However, because of the new, low price recently established, the use of Carboloy tips on micrometers has been extended to practically all applications. One standard price for tipping all micrometers, regardless of size, has been established. A descriptive leaflet may be obtained by writing the Carboloy Company at 2975 E. Jefferson Avenue, Detrolt, Michigan.

Cochrane-Bly Improved No. 2-B Metal Sawing Machine

The Cochrane-Bly Co., Rochester, N. Y., has brought out a small cir-

cular saw arranged with support track and stock feed for cutting small round bars in multiple. The vise has capacity for holding eight 1½-in. round bars or 118 ¼-in. bars at one time, and will



Cochrane-Bly Improved No. 2-B Metal Sawing

make a cut in $1\frac{1}{2}$ minutes. Other sizes are held in proportion. The machine uses a 16-in. diameter inserted tooth saw blade.

The machine is motor driven by a 2

CHAMPION PORTABLE VISE STAND



A Movable Bench

Very Substantial

A great convenience in Assembling Rooms and Repair Shops.

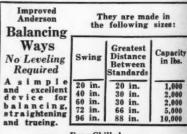
Especially adapted for Automobile Repair shops.

Made in two sizes.
Furnished with and without vises.

Catalog upon request.

The Western Tool & Mfg., Co.

SPRINGFIELD, OHIO





Write for Full Information
Made Anderson Bros. Mfg.Co.

by Milution Dido Highward 1926 Kishwaukee St., Rockford, Ill.

May,

e U. conver unit. minut

The

2

Webu

up W die

V

9

720

ine

oth

3 2



MULTIPLE UNITS

from single drills

• U. S. Multiple Drill Head Units quickly convert any single spindle drill into a multiple unit. Thus, you are assured more holes per minute and larger profits.

Send blue prints for estimates.

The United States Drill Head Co. 1954 Riverside Drive CINCINNATI, OHIO

STAMPINGS



We have been in the job stamping business for over 20 years, and have a well equipped plant with 30 presses ranging from small size up to 30 ton ram pressure.

We are equipped to make our own dies in our modern die shop.

Send sample or blueprints for estimate to Dept. 1.

BROS.

930-936 W. Hill Street, Louisville, Ky.

SENSATIONAL VEW DEVELOPMENT

EVANS REAMERS SURPASS ALL. HIGH SPEED STEEL.

No Honing. Chrome Like Finish.

50 to 80 thousandths expansion. Full Bearing Surface. Perfect Alignment. Will not chatter. With Left and Right Spirals. It can not fall in slots or oil grooves.

3-SPEED REAMER



EVANS REAMING SHOP

WRITE FOR CIRCULAR

EVANS FLEXIBLE REAMER CORP. 3656 Lincoln Ave., Chicago, III.

May,

NE

TO

h.p., 1200 r.p.m. motor through multiple V-belts with welded steel guard. If desired, the machine can be furnished with a triple-screw vise, for holding the pieces being cut off outside of the saw blade insuring clean cuts without prong. The machine is provided with a lubricant pump with flexible tube and distributing nozzle over the saw blade.

The machine can also be arranged for cutting single bars, and is provided with three changes of feed for hard and soft stock. The weight of the machine is approximately 1600 lbs. Floor space re-

quired, 29x50 inches.

PRECISION BORING



Easy and Economical with Flynn Micrometer Boring Heads

Write for catalog

FLYNN MFG. COMPANY
437 Bates St., Detroit, Mich.

"Logan" Balanced Four-Way Piston-Type Hydraulic Control Valve

Logansport Machine, Inc., Logansport, Indiana, has just completed an entire new line of "Logan" Balanced Four-



"Logan" Balanced Four-Way Piston-Type Hydraulic Control Valves

CENTERLESS GRINDING

Accuracy-Prompt Service

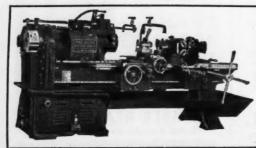
Commercial Centerless Grinding Co.

6538 Carnegie Ave., Cleveland

Way Piston Type Hydraulic Control Valves. Attention is especially directed to the universal application features of this line of valves. The body is so designed that it may be rotated in relation to the end covers. This rotation brings the several pipe connections into the position required. To accomplish this it is only necessary to remove four screws from each cover.

This adjustable feature eliminates the use of special valves, reduces internal friction, fitting and labor cost for plping the hydraulic circuit, by eliminating elbows, steel ells, and so on.

The end covers and bodies are made



Cincinnati Acme Universal Turret Lathes

A powerful rigid machine for a wide range of accurate bar and chuck work.

Write for Circular

THE ACME MACHINE TOOL COMPANY

ur-



NEW 6X6 HIGH SPEED POWER SAW

Gravity Feed Expanding Clutch Length Gauge Automatic Stop Automotive Relieving Device Dovetailed Saw Frame Guide

L-W CHUCK CO

No. 20 N. St. Clair St.

• OHIO

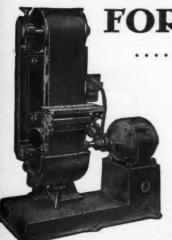
"Stark"



SPIRAL • UNIVERSAL • PLAIN

The most accurate by far. Ideal for toolroom and laboratory. Best for Manufacturing Motor Drive Unit or countershaft.

STARK TOOL CO.
Estab'd 1862 Waltham, Mass.



FOR MEN ONLY

. . who are interested in better finishing at lower cost

Peerless Surfacers give a high quality, straight line finish to metal, rubber, fibre, composition, wood, etc. The superiority of the abrasive belt method is due both to the finer quality of work done the Peerless way and to the increased production obtained. The advantages of a straight, grained finish and the economies of time and material warrant careful consideration. Vertical or horizontal machines available in 4" to 20" sizes.

Write for further details.

PRODUCTION MACHINE CO., GREENFIELD, MASS.



Standard GRINDERS 1/4 H. P. 6" wheels to 15 H. P. 30" wheels.

DISC GRINDERS, 1 H. P. to 7½ H. P. Buffing and Polishing Lathes, ½ H. P. to 20

from chrome nickel iron, and valve piston from alloy steel, hardened and ground. The piston is a close sliding fit in valve body, and of balanced type construction, permitting ease of opera-tion, under all conditions and pressures. No packing is used in the valves except stem seals and they are subject only to exhaust pressures.

Model 20 Ace A.C. Portable Arc Welder

Pier Equipment Manufacturing Company, Benton Harbor, Mich., has developed an A.C. portable arc welder in the design of which is incorporated a specially designed transformer with react-

Do You Use Hand Trucks



Super-Strength

OR TRAILERS? — why not fit them with End-Wood Wheels and SAVE YOUR FLOORS and make your trucks last longer? trucks roll easier and

Wheels for all trucks. Casters for all purposes. Write for catalog, prices and discounts.

METZGAR CO. 112 Logan St., S.W. Grand Rapids, Mich. U. S. A.



An Inexpensive ABRASIVE BAND GRINDE

"Built Like a Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION, complete with grease gun.

Write for illustrated folder on this and other styles and sizes.

HORMEL-M GRINDER

WALLS SALES CORP.

NEW YORK, N. Y. 96 WARREN ST.



Model 20 Ace A. C. Portable Arc Welder

ance and which employs a circuit that provides a stable non-blasting arc without spatter loss. The welder may be used for fillet, horizontal, vertical or overhead welding and can be used for welding from 22 gauge sheet metal to heavy castings. The machine is said to provide a very obedient arc without magnetic blow.

The manufacturer states that the welder is more than 90 per cent efficient at full load and that it is deMay, 1

STO

er ic elts fro at vacuu Order no

Vacuu 1010 F

U

1770

pis-

and

ype

res, ept to

rc

mel-

the

pe-

ct-

1-

30

10

ıt

STOP BELT SLIPPING!



Pat'd U. S. Canada Great Britain

VACUUM CUP METAL PULLEYS

Guaranteed to: Eliminate belt slippage and power loss . . Increase life of belts and guilpment . . . wear indefinitely . . . keep belts from flying off. . Belt is sealed to pulley at vacuum contacts.
Order now on 30 DAY FREE TRIAL OFFER.
Used in many of the largest plants.

Vacuum Cup Metal Pulley Go., Inc-

1010 Ford Bldg. Detroit, Mich.



ALWAYS READY TO SHIP

221

Thousands of Stock Sizes of

SPROCKETS,
SPEED REDUCERS and
FLEXIBLE COUPLINGS

Send for 176 Page CATALOG G-58



CHARLES BOT

617-623 Arch St., Philadelphia, Pa.

RAGINE

HYDRAULIC PRODUCTION SAWS



Capacities: 10"x10", 12"x12", 10"x 16" and 12"x16". Heavy Duty Machines for bar steel, die blocks, structurals, etc.

Full Hydraulic Control.

Easy Operation through single lever.

Three speeds for full range of steels.

Cutting rates never before obtained on reciprocating power saws.

Full line of sizes and types.

RACINE TOOL & MACHINE CO.

1770 STATE ST.

RACINE, WISCONSIN

signed and built in keeping with the standards prescribed by both the American Welding Society and the American Institute of Electrical Engineers. It is claimed that the production efficiency, performance and penetration of the welder is of a highly satisfactory quality when used with a good grade of coated welding rod.

Through a special circuit control, described as the "Ace Synchro Control", it is stated that both welding current and voltage are controlled in a highly

efficient manner.

The Ace A.C. Arc Welder is designed for use on 220 or 440 volts, with a fre-

quency of 60 cycles and is made in size from 15 to 250 amperes for use with from 1/16 to 1/4 in. welding rod.

Johansson No. 2 Gage Block Set Introduction of a new No. 2 set of precision gage blocks at a price some what less than the cost of the presen widely-used No. 2 sets is announced by the Johansson Division of the Ford Mo



Johansson No. 2 Precision Gage Block Set

tor Company, Dearborn, Michigan. It is offered in addition to the present No.

The new No. 2 set is the same as the present No. 2 set except for four accessory items—two jaws and two adjustable holders. Blocks are of "B", "A" an "AA" qualities, accurate to within plu-or minus eight, four and two millionth of an inch.

The thirty-five gage blocks comprising the new set provide 80,000 different siz measurements in steps of one ten-thousandths inch. Blocks alone are used in a great number of precision measure-

IDEAL SPEED LATHES



FOR LAPPING FINISHING POLISHING SMALL PARTS

Speed Motor. Automatic Brake. Collet or 3 Jaw Chucks. Hand Chucks. Handoperated or automatic. Write for matic. V Cir. 351.

SCHAUER MACHINE CO. Cincinnati, Ohio

905-7 Broadway

GEARS

Good Gears Only

All Kinds **Any Quantity**

At the Right Price

THE CINCINNATI GEAR CO. 1825 READING ROAD, CINCINNATI, OHIO



7 1/2 in. Rotary Table for Small Miller Tables

Send for circular.

STEVENS ROTARY TABLE DIAL INDEXING TYPE

Table graduated for single degree reading. Worm can be disengaged for turning table by hand.

Other sizes 12", 18" and 24" diameters.

JOHN B. STEVENS INC.

NEW YORK, N. Y. 306 HUDSON ST.

Set

It is

th

ces

an olu

dn

siz ou-

iz

re-



There's a RUTHMAN "Gusher" Coolant Pump for every type of machine tool. Designed to meet every cutting need, the "Gusher" is quiet, dependable and economical.

"GUSHER" FEATURES:

Lower power consumption.
Elimination of packing glands.
Automatic priming.
Use of centrifugal force.
Instantaneous flow.

Write for Free Data Sheets.



STOP DRILL WASTE!

WITH A

"BLACK DIAMOND"

The money you save by BLACK DIA-MOND drill grinding quickly pays for the cost of the machine. The BLACK DIAMOND grids the lips exactly the same length— ives the drill the proper angle and cleatence to insure easy cutting—needs no complicated adjustments on drills from No. 60 to ½".

Write for Bulletin.



BLACK DIAMOND

SAW & MACHINE WORKS, INC. 45 North Ave. Natick, Mass.

The

unir of

this

job.

free

com

ant

with

trif

tion ing.

pac

LEI

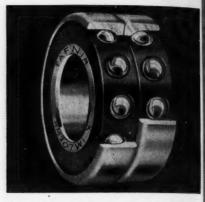
ments; and the set without accessories is useful also to those who already have adjustable holders and jaws, but need more blocks.

In keeping with the announcement of a gage block set at a lower price, the Johansson Division has also substantially reduced prices on all "A" quality protein blocks. Complete information on metric blocks. Complete information on all Johansson gage blocks and accessories is shown in the new No. 12 catalogue, just off the press.

Fafnir X Type "Extreme Precision" **Duplex Ball Bearings**

Ball bearings so accurate that they are inspected, gaged and tested in a special air-conditioned room, to be known as X_Type Extreme Precision Duplex Ball Bearings, are now being made by the Fainir Bearing Company, New Britain, Conn. Built primarily for use in high speed grinding equipment where shaft speeds range from 5000 to 40,000 r.p.m., Fafnir X Type bearings are said to have already established gratifying performance records. A life of 2000 to 3000 or more has regularly been obtained in spite of unusual load and speed requirements.

The Fafnir X Type bearing is carried



Fafnir X Type "Extreme Precision" Duplex Ball Bearings

in stock as a full line. It is furnished in nine sizes from 12 mm. to 45 mm. bore, exclusively in duplex pairs. Permissible tolerances are 0.0001 in. on the bore and 0.0002 in. on the outside diameter. The X Type is preloaded at the time of assembly and is supplied with light but sturdy composition retainers,





Protected against Burn-Out 1 YEAR GUARANTEE

Ruggedly built. 14 H.P. Capacitor type motor protects against burn-out. 6"x % " wheels. Adjustable

BALDOR ELECTRIC COMPANY (Electrical Manufacturers for 17 years) St. Louis, Mo. 4380 Duncan Ave.

Write for Bulletins





Double capacity over ordinary machine vises.

One piece hand wheel and nut — extra long thread. Hardened tool steel jaws, reversible for V-groove or plain surface. Write for circular.

Jaws 6 %" wide . 2 ½" deep . . open 8 %".

J. E. MARTIN TOOL & DIE WKS. Springfield, Ohio

uplex

shed

mm. Per-

the

the

with

ners,

G pro-

rip

log

ng ole

I.

BROWNIE COOLANT PUMPS

There is always an uninterrupted flow of coolant when this pump is on the job. It is trouble-free in operation, it pumps lapping compound, or coolant impregnated with emery. Centrifugal in operation, it is self aligning. There are no packings to leak.

OPEN TYPE



THE TOMKINS-JOHNSON CO.
620 N. Mechanic St., Jackson, Michigan

There are no screens to clog. The drive shaft and impeller tube are one unit revolving together. Coolant cannot come in contact with the Ball Bearings which are within 1 inch of the impeller. Capacities 9-76 G.P.M.

CLOSED

LEFT-HAND ANGLE CUTTING BLADES . . . A FEATURE OF THIS FINE 5/8 IN. TO 3 1/32 IN. WETMORE REAMER

The Type No. 36 Wetmore Adjustable Heavy-Duty Reamer is noted for easy adjustment, long blade life and marked adaptability to screw machine work . . . features of the famous Wetmore design. Write for Catalog No. 36.



 SPECIAL TOOLS Designers and tool engineers are invited to avail themselves of our consulting service on all reaming operations—standard or special. We build practical and efficient special tools to decrease your manufacturing costs.

WETMORE REAMER COMPANY 420 N. 27th St., Milwaukee, Wis.

Mcy,

to

He

size

Shi

St

ms

Sene

which are said to be the most satisfactory type for such extremely high speed service.

Dodge Neoprene Cushion Bearing

Vibration and noise from revolving shafts have present-ed problems in ab-sorption to engineers, particularly where the machin-

ery is to be installed in homes, office buildings or other public buildings. The difficulty is sometimes further complicated by the necessity of obtaining a cushioning material which would at the same time resist the action of oil needed

to lubricate the shaft.

An insulated bearing which meets these conditions successfully has been designed by the Dodge Manufacturing Company, Mishawaka, Indiana. The bearing is self-oiling, providing oil for the shaft by capillary action from the reservoir contained in the cast iron inner housing. Oil from the reservoir



Dodge Neoprene Cushion Bearing

flows through absorbent material to a porous bronze liner or bushing which absorbs oil equal to about one-third of its volume.

Vibrations and sounds from the moving parts of a shaft bearing, designed primarily for air conditioning and heating apparatus, are absorbed by bands of neoprene, the chloroprene rubber manufactured by the du Pont Company, inserted between the inner unit and the outer casting of the bearing.
The band of neoprene between the

casings cushions vibrations resulting from unbalanced rotors or couplings and



MAGNETIC CHUCKS

Highest Quality All Sizes — For All Types of Work. A Complete Line Of Rotary, Rectangular and Swiveling Mag-netic Chucks.

35 Years Experience Write for catalog and price list No. 11

O. S. WALKER CO., INC. WOBURN AVE. WORCESTER, MASS.



lo. 1 cuts up to No. 11 gauge strip or sheet. lo. 2 cuts up to $\frac{1}{4}$ " steel plate. Special Blades for shearing stainless steel.

BREMIL MFG. CO. 1725 PITTSBURGH AVE. ERIE, PA.



STEEGE Junior Motor Drives

Adaptable to Any Cone Pulley Machine! Give higher production at lower cost—are simple and easy to operate-pay for themselves in savings. Send for catalog.

PRICED FROM \$35.00 UP

L. STEEGE MACHINERY COMPANY

21 S. CLINTON ST.

CHICAGO, ILL.

o a nich l of

107-

ned

eat-

s of

nuin-

the

the ing

1

S

. !

d

CRALEY OFF-SET BORING HEAD



No. 4 Head for Boring holes to 10" diameter. These Boring Head Sets are made in six sizes. Write for Prices.

C. C. Craley Mfg. Co. Shillington, Pa.

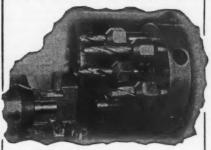


DROP FORGED STEEL

Standardized Die Sets, embodying many exclusive features, and a listing of more than 185,000 stock sizes, afford a service that is unsurpassed.

Send for Our New 288 Page Catalog

E. A. Baumbach Mfg. Co. 1806 S. Kilbourne Ave., Chicago, III. UNIVERSAL COLLET CHUCKS



Automatic Screw Machine, holding Drill - Counterbore - Center Drill and Reamer in UNIVERSAL COLLET CHUCK

[One of the Many Uses]

RIGID

GRIP AS STRONG
AS SOLID

STEEL

CONCENTRIC WITHIN .001

For Holding End Mills, Drills, Taps, Center Point, Keyway Cutters etc.

FOR LITERATURE WRITE TO

UNIVERSAL ENGINEERING CO. FRANKENMUTH, MICH.

May,

absorbs sounds developed by rotating parts. It also provides a self-alignment of the shaft and bearing. For this installation, neoprene was found to be highly efficient because it had the necessary resilience for absorption of vibration, and was also able to withstand the disintegrating effect of oil at high tem-peratures which occasionally runs down from the shaft over the bearing.

The use of rubber-like material such as neoprene, in spite of its higher cost, actually resulted in a lower cost of manufacture of the bearing because it eliminated the necessity of machining the surface of the cast iron inner casing, an operation which had cost more than the neoprene band itself.

Alco Drill Chuck

Illustrated herewith is the Alco Drill Chuck - a chuck especially developed for use with any screw machine—and marketed by Alco Tool Company, Bridge-



Alco Drill Chuck

Moving

Curved

GEAR

Send for Circular G32

which gives formulae and tooth-factor tables. $M = PD \times F + G$

THE VAN KEUREN CO. MASS. WATERTOWN,

Surface Temperatures The "Alnor" Flat Stationary

> Pyrocon Ideal for rolls, molds, plates, platens and plastic material temperatures.
> Write for bulletin.

Combination

Illinois Testing Laboratories, Inc. 146 W. Austin Ave. Chicago, Illinois Chicago, Illinois

port, Conn. The chuck is of simple design and can be adjusted to take any drill within its size range by the use of a wrench only. No bushing is re-quired; it will hold the drill securely

under the most severe conditions.

The chuck is full floating. Cams on rhe chuck is full hoating. Cams in existing machines are not affected; the chuck is adaptable for replacing old type drill bushing holders of the design which requires a separate size bushing for each size of drill, and provision is



CULLMAN SPEED REDUCI

Motors From 1/8 to 15 H. P. Send for Catalog

Cullman Wheel Company

1336 Altgeld St., Chicago, Ill.

more

1937

Drill loped -and ridge-

e deany

use s reurely

s on

the

old esign hing

n is





FLEXIBLE SHAFTS & MACHINES SIXTY TYPES AND SIZES 1/8 TO 2 H. P.

Covering Hundreds of Operations Manufactured by

N. A. STRAND & CO.

5001 NO. LINCOLN ST. - CHICAGO



EDGEMONT" SERVICE FRICTION CLUTCHES DISC "TYPE SF"

> The efficiency of any machine can be increased by using the "Type SF" Disc Clutch. It is designed and built to stand hard usage, high or low speeds, frequent operation, and has quick one hand adjust-ment for liner wear.

> "Type SF" Disc Clutch Mechanisms are furnished separate, and in a complete line of pulleys, extended sleeves and cut-off couplings. Circular on request.

THE EDGEMONT MACHINE CO.

2100 HOME AVE.

DAYTON, OHIO



THE NEW LENNEY

VARIABLE SPEED TRANSMISSION

A Size and Type to Fit Every Purpose 1/8 to 5 H. P.

OUTPUT: 2 2/5 to 1 or 8 to I INFINITE VARIETY.

FEATURES

- POSITIVE DRIVE Set speed is running speed. Shock loads will not change the speed.
- 2. OPERATES IN BOTH DIRECTIONS— Reversing speed same as forward speed.
- SELECTIVITY OF SPEED Speed 3. SELECTIVITY OF BEELE can be changed while transmission is running or at rest.
- 4. FREEDOM FROM VIBRATION-Absence of reciprocating parts insures quietness.

Write for new 1937 Catalog.

THE LENNEY MACHINE & MANUFACTURING CO.

WARREN,

OHIO

Re St me Co

De

made for plenty of clearance. Inasmuch as no bushings are used, no time is lost in changing drills of various sizes. The chuck is designed for hard service and is built of selected materials.

Morse High-Torque Indexing and Free-Wheeling Clutch

A newly designed high-torque indexing and free-wheeling clutch has been announced by the Morse Chain Company, Ithaca, N. Y. Designed to fill the need for a simple, high-grade, inexpensive clutch to transmit power in one direction, this new unit's construction em-

The Table

M-D Facing Heads
With Automatic Feed

Can be attached to Column Boring Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically, and covers faces 6" to 30".

Write for circular.

MUMMERT-DIXON CO.
120 Philadelphia St. Hanover, Pa.

HOUGH Stop Watches

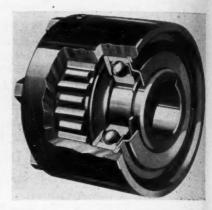
Where good work depends on accurate timing — a good watch saves money. We specialize in Stop Watch repairs.

THOMAS R.
HOUGH
ASSOCIA : ES
Engineers-Distributors
5337 Belle Plaine Ave
Chicago III



bodies features which ensure smooth, positive cam action and eliminate ratchet noise and backlash.

In the new clutch, multiple cams are



Morse High-Torque Indexing and Free-Wheeling Clutch

used, spaced alternately with hardened ground steel rollers to distribute the load evenly on each cam—a feature which permits high torque loads without danger to the cam surfaces and allows greater cam contact surface for a given clutch diameter.

The cam action is governed by two leaf springs that contact shouldered surfaces milled at each end of the cams. The point of spring contact is such that a rocking action is created, with the fulcrum point at the center of the cams. Thus, when the speed of the inner and outer races synchronize, the cams immediately roll into a locking or driving position. The profile of the cams has been scientifically developed so that grip and breakaway are remarkably precise, with-



LOWER YOUR

With Copper Head Expansion Laps. Profitably used in hundreds of leading shops. Available in sizes from 'a" to 2 1/2", graduated by sixteenths of an inch.

Many other designs for special applications.

Write for Bulletin
BOYAR-SCHULTZ

CORPORATION 2120 Walnut Street, Chicago, III.

ooth, rat-

s are

Vheel-

ened the ture vithand two surams. that the ams. and mepo-peen and ith-

1.

231



THE M-B

"Super" Speed Air Grinder An Outstand-

ing Performer
The ONLY Hand Grinder with Spindle Speed of 100,000 R.P.M. Operates on Air Pressures of 45-100 pounds. Weighs 8½

Combined Automatic Lubricator and Air Line Filter

Delivers Absolutely Clean, Lubricated Air to Bearings of Any Tools, Operated Off Air Lines. Eliminates Costly Shut Downs.

WRITE FOR FULL PARTICULARS M-B PRODUCTS

130 E. LARNED ST., DETROIT, MICH.



KEEP YOUR MATERIALS ON THE MOVE CLARK LIFT JACK

AND PLATFORM EQUIPMENT

Save time and floor space. Jack will raise 6000 lb. load with only 76 pounds handle pressure. Requires only 12 inches head room. Standard and special platforms for every require-

Cost is low—Savings are high.
WRITE FOR CATALOGUE
ALL STEEL WELDED TRUCK CORP.

Designers and builders of Standard and Special Material Handling Equipment. 1123 Railroad Avenue, Rockford, Illinois

When locked, HANDLE IS FREE, REQUIRING NO PRESSURE TO KEEP





No. 38 FOREMAN'S DESK





No. 110 WOOD SEATED STOOL

. 1018 CHAIR WITH WOOD SEAT No.

No. 440 STEEL SEATED STOOL

E STEEL STO

Write for Catalog "ME"

PLAINWELL, MICHIGAN

May,

out attendant noise or shock.

A ball bearing at one end separates the members and stabilizes the load. The opposite end of the unit is prepared for the attachment of sprocket wheel, ratchet arm, or belt pulley. Lubrication is self-contained.

B-K Filing and Lapping Machine

The filing and lapping machine shown in the illustrations herewith has been placed on the market by Brickner-Kropf Machine Company, Inc., Muskegon, Mich. Though primarily designed for the ma-







B-K Filing and Lapping Machine

chine finishing of shoulder punches, the machine is said to be equally efficient wherever machine filing or lapping is required. Overhead construction brings the work close to the chuck, thus providing for a maximum of accuracy and minimum of tool breakage. The file holder may quickly be removed from the work without disturbance of any adjustment. The table and head are

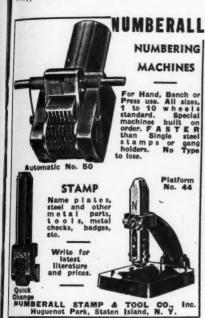


check

Wo

is

m



COMTOR PLUG

more precise than the finest



Many firms find their modern machines give accuracy beyond the ability of ordinary gages to check. Comtorplug mechanically assures uniform accuracy inside ½ of 1/10,000th.

Write for new Bulletin 25

THE COMTOR CO.

Waltham, Mass.

Est. 1927

set of dies



threads 4 sizes of pipe

Instead of 16 separate dies usually needed to thread 1", 11/4", 11/2" and 2" pipe, this RIEGID No. 65R threader threads them all perfectly with one set of 4 dies, that stay in the threaders, can't get lost.

Move the change plate to the size of pipe and the threader is ready for work. Even the new style work-holder sets to size with a twist of a gauge ring—put it on the pipe and tighten with one screw.

You'll like these and other features of this remarkable tool. Ask your Jobber to show you a RIPOID No. 65R.

THE RIDGE TOOL CO.





May,



TRUMORE Diamond Tools

Durable diamonds in Nickel Alloy Mounting Reduce truing costs.

F. F. GILMORE & CO.

112 DARTMOUTH ST.

BOSTON

L-R FLEXIBLE COUPLING



everlasting

non-lubricated

Best, most efficient coupling for small machines. Low cost. Noise-, less. Sizes 3/16" up.

PATENTED

Write for test sample.

LOVEJOY FLEXIBLE COUPLING CO.

SMOT WEST LAKE STREET

CHICAGO, ELLINGIS

DANLY PRECISION DIE SETS



Danly All-Steel Sets
Danly Commercial Sets
Danly Die Makers' Supplies

DANLY SERVICE

7 Danly Warehouses Provide 24-Hour Service for 85% of All Metal Fabricating Plants

DANLY MACHINE SPECIALTIES, INC.

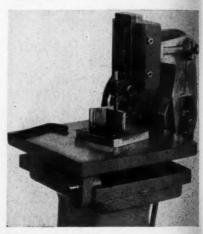
2122 South 52nd Avenue, Chicago, III. 513 East Buffalo Street, Milwaukee, Wis. Long Island City, N. Y., 36-12 34th Street Dayton, Ohio, 990 E. Monument Avenue Detroit, Michigan, 1549 Temple Avenue Roohester, N. Y., 16 Commercial Street Cleveland, Ohio, 1444 East 49th Street Philadelphia, Pa., 3813 North Broad Street

DANLY DIE MAKERS

both of the tilting type and one wrench only is required for all adjustments.

The file is held in a T-type hardened jaw which can be adjusted vertically without change in alignment. The rocker arm pin, which is hardened and ground operates in two rows of needle bearing. Shoes are of steel and are replaceable. The drive shaft and head are in one piece, operating in two rows of ball bearings.

The table is 834x9 in. in size. The distance from the table to the head is 3



Close view of B-K Filing and Lapping Machine Table showing operating mechanism and file chuck.

in. and the stroke may be adjusted from 0 to 1 in. Three and one-half in. of adjustment is provided for the file helder. The machine is powered by a 4 h.p. 110 volt 60 cycle 1725 r.p.m. motor, transmitting power through a single V-belt. The speed regularly furnished is 700 r.p.m., but slower speeds are optional. The height from the figor to the table is 37 in. Net weight is 163 lbs. A heavy duty switch and 10 ft. of three - wire rubber-covered connecting cord are standard equipment.

Whitney Drive Cleat Notcher

The Whitney Metal Tool Company, Rockford, Illinois, announces the development of a special notching punch and die to be used on their standard No. 28 Kick Press for reducing the cost of producing drive cleats (also called "drive slips") which are used in fastening dut sections together. By using this tool,

rench

rings, eable.

The

rom
of holholotor,
ngle
shed

opto 163

. or

ny, veland

No. of ive uct

ts. dened tically rocker ound.



FURNAS STANDARD DRUM SWITCHES

For Reversing and Two Speed Motors

Compact and rugged, extensively used wherever motors are to be reversed, or speed is to be changed. These controllers can be readily adapted to a variety of special switching combinations. We invite inquiries for special controllers.

Write for catalog giving details of fifty different styles.

FURNAS ELECTRIC CO. 815 S. 72nd St. West Allis, Wis.



May

VI C H T



Whitney Drive Cleat Notcher

a material saving in the production of these cleats can be realized, sufficient to pay for the cost of the equipment in a very short time.

As shown in the illustration, the punch cuts two special tapered notches at the end of the galvanized cleat stock

in one operation, after which the sides are folded in (by other means) to form the finished cleat. The right-hand punch has extra width to assure a finished job even if there are slight variations in the width of the blanks. Guides on the shoe assure proper positioning of the blanks for punching. The illustration also shows a shearing punch and die for cutting off straight stock to the desired lengths; this punch and shoe being easily substituted for the notching unit.

Punch and die sets of the same general construction are available for the various types of seams which are included in common practice. Besides those used on flat seams and square boxes, there are the familiar govern-ment lock pattern, and the pocket joint pattern. Since the press itself is a standard unit, Whitney punches and dies for all kinds of square, rectangular, and round holes can also be used on it.

A time study of production operations brought forth the following results on

drive cleats for flat seams:

The time required to cut four notches in a cleat was reduced from 2.9 min. (hand operation) to 0.3 min., production was increased from 21 to 200 cleats per hour, and the cost per piece was reduced from \$.0476 to \$.0050.

This shows a saving on labor cost of

COLUMBIA LOCK-NUT

COLUMBIA NUT & BOLT CO., Inc.

BRIDGEPORT, CONN.



Makers of LOCK-NUTS **NUT-LOCKS**

> for every use since 1900

Ask for Samples

Rotary HAND CUT--ALL SHAPES

SEND FOR ILLUSTRATED 10th Anniversary Catalog—showing multitude of styles, shapes and cuts. THE ROTARY FILE COMPANY STRATFORD CONN.

WAY TO SURE CUT EXPENSE

The CLEMENTS -CADILLAC



For safe, quick cleaning anywhere in the shop use this PORTABLE tool. Removes foreign particles from motors and intricate machinery—reduces risks of "shorts" and "burnouts"—minimizes fire hazard and excess wear. Plugs in any light socket — no expensive installation required.

CLEMENTS MFG. CO. 6655 So. Narragansett Ave.



Ask for FREE Trial

& VINCENT

CUTTERS

are MILLED

(not stamped)

From Special Steel

To give longer life, Vincent-

MILLED from specially se-

Heat treatment is vitally important in cutter manufacture. In buying Vincent tools,

you get the benefit of many years of experience in the special heat treat-ing of tools.

Every

ciency.

(Vincent operates one

of the oldest and largest commercial heat treat-ing plants in the coun-

has 18 teeth, thus as-

suring maximum effi-

The "Vincent Process" a special heat treating

formula used on all cut-

ters, assures maximum durability.

Vincent - Huntington

e m e r y wheel dresser cutters are standard in many of the world's largest industrial plants.

Vincent cutter

Huntington cutters are

lected steel.

Every

VINCENT

Cutter

Has 18

Teeth

Count

Them!

sides form punch ed job ns in on the f the ration lie for lesired g easmit. genr the

e inesides quare vernjoint tandes for and tions

s on tches min. ction s per re-

st of

L S

Y N.

Specify "VINCENT" on your next order for grinding wheel tools. Get the best at no extra cost.

The Vincent Steel Process Co. 2434 Bellevue Ave.

Detroit, Mich.

Measured By Cuts **Between Grinds**



MIDWEST MILLING CUTTERS Pay Their Own Way

ORRECTLY designed to cut free-Cly, eliminate chatter, and provide ample chip clearance. Made from carefully selected materials and expertly heat-treated to take maximum number of cuts between grinds at high speed.

Midwest Tool & Mfg. Co.

2358 W. Jefferson Ave. Detroit, Mich.



Send for Catalog 14-M showing Midwest's complete line of standard and special Milling Outters a n d End-Cutting Tools.

Ma

For Machine and Tool Work and Quick Set-Ups



PLAY SAFE!

Use a GERSTNER TOOL CHEST!



Assure protection to Assure protection to so your good to ols against loss and damage. A size and a style for every machinist, tool, die and pattern maker. Get your Gerstner Chest from your distributor. Ask us for free catalog.

1265 Columbia St.

Dayton, Ohio

THE SIMPLIFIED ODTICAL PYROMETER



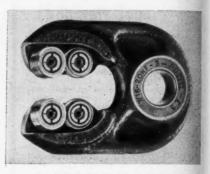
Unique construction enables operator to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

THE PYROMETER INSTRUMENT CO. 101-105 Lafayette St., New York

\$.0426 per cleat. The tool would pay for itself on this operation within 12 hours of use.

Pratt & Whitney John-Sons Roll

Thread Snap Gages
Pratt & Whitney Division, Niles-Bement-Pond Company, Hartford, Conn., presents a new series of thread measurement snap gages, in the design of which



J-S Roll Thread Snap Gage

are incorporated rollers having 60-deg. annual ribs which engage the thread over a considerable portion of its length, making it possible to check the thread for diameter and for periodic and accum-ulative lead errors. Variation from true ulative lead errors. Variation from true form or angle of the thread is easily checked by the use of this gage. The "Go" roll ribs have full thread form profile, while the "Not Go" roll ribs have a modified profile. Passing the thread from one to the other shows up form errors easily.

By rotating the screw thread a quarter turn while it is in contact with the "Not Go" rolls, out-of-roundness is immediately detected and gaged. If the

STURDIMATIC LIVE CENTER for LATHES, GRINDERS and MILLING MACHII



It turns with the work. Eliminates friction of dead

Lowest possible overhang prevents vibration and chatter.

Write for Catalog and Free Trial Offer 5222 THIRD ST., DETROIT, MICHIGAN

STURDIMATIC TOOL COMPANY

pay n 12

Roll

-Beonn.

sure hich

deg. read gth, read ımtrue sily The

orm

ave

ead

orm

IRF-

the im-

the

DETROIT



BROACHING SPECIALISTS

Fully equipped to fill your needs in all kinds of broaches. Let our experienced engineers solve your broach problems. Send drawings.

DETROIT BROACH CO.

6000 Beniteau Ave. DETROIT, MICH.

ACHES



Checking the Work on Small Machines

Productimeter 5D1 is the counter for bench millers, small lathes, drill presses, etc.

Save cost of hand counting with Productimeters on all production machines.

Productimeters

DURANT MFG. CO.

1932 N. Buffum St. 173 Eddy St. Milwaukee, Wis. Providence, R. L.

TELL US WHAT YOU WANT TO COUNT

Two Compact Centrifugal Motorpumps



-self-contained -save expensive power take-off -dependable

No. 204-a new design, giving good volume at low head. Discharge is at top.



sturdy unit of large capacity. Discharge pipe clears motor-no elbows needed.

Ask for data on the full line.

Brown & Sharpe Mfg. Co. Providence, R. L.

Brown & Sharpe PUMPS

May,

si to

el

R

Ma

Machi

casting

rugged

cycle Madi

Clutch for se hesital well

your machi Pullm

satisfa

ment durab invest inform

RO

Bor

thread is undersize at any point, it will drop through the "Not Go" rolls. If the newly presented diameter is oversize, the screw cannot be passed out between the "Go" rolls. Elliptical or oval threads are detected in the same manner. The straightness of a screw thread is determined by successively bringing both ends of the thread in contact with the "Not Go" rolls, which will detect an undersize condition at any point. Straightness in oversize threads can be checked in a similar manner, using the "Go" rolls.

John-Sons gages are of two general

types as illustrated. The closed type with the gage roll supported at both ends is for most classes of work. The open type with the roll supported in one end only is for use where the work runs up close to a shoulder. John-Sons



Setting a J-S Gage with a Setting Bar

gages are furnished standard with the American National form of thread. All other forms are considered special, but these gages can be furnished for any thread forms or with any special configurations (other than threads) on the gage rolls required by the customer.

Pitch diameter adjustment is obtained by mounting the rolls on eccentric pins which can be adjusted to change the dimension between the rolls. When the correct dimension has been obtained, the pins are located tightly, holding the rolls accurately in position by allowing them to rotate freely. Setting bars and plugs for accurately setting J-S gages can be supplied. The setting plug is a conven-



ELIMINATE SPECIAL AND COSTLY JIG FIXTURES

By Using Yost Drill Press Vises

They are heavily constructed and very compact. Three flanges on the base permit easy attachment to machine or drill press table. A "V" shaped slot milled in the movable jaw permits a positive locking of vertical work. The ease and simplicity in operating makes this tool an indispensable factor in the execution of drill press operations.



Write us for circular "H", giving us name of your nearest dealer.

YOST MANUFACTURING COMPANY, MEADVILLE, PA.

type

The ted in

Work a-Sons

> the All

but any conthe

ined pins

the the

the

rolls

hem lugs

be

ren-

\$

BETTER CUTTING

LONGER SERVICE

A full line of saws for metal slitting, and for slotting of screws, piston rings, commutators, etc. Also a quality line

of Combination Center Drills.

Lower saw costs with CIRCLE "R" SAWS . . . guaranteed to give entire satisfaction. Write for complete cat-

alog. Let us RCLE "R" TOO quote prices.





CIRCULAR TOOL CO., Inc.

767 Allens Ave.

Providence, R. I.

REPRESENTATIVES: WRIGHT-GADE EQUIP. CO. L. 4. COUSINS & SON 2411 14th St., Detroit DONALD ROBERTSON 1813 South Avenue, Son 1849 W. Randolph St., Chicage PRODUCTION TOOL CO., 4500 Euclid Ave., Cleveland

L. G. NOBLE 100 Parneli Ave., Dayton, O. GILBERT T. OSBORNE 806 N. Oakland Ave., indianapolis, Ind.

PULLMORE CLUTCHES used Madison-Kipp Largest Die Casting

The No. 8 Madison-Kipp Die Casting Machine illustrated at right weighs 30,000 pounds and is probably the largest die casting machine in the world. It is fast, rusged, powerful, has full automatic cycle after engaging the Pullmore Clutch. Madison-Kipp have used Pullmore Clutches in their die casting machines for several years and write "We do not hesitate at all to say that we are very well satisfied with the performance of your clutches on our die casting machines."

Pullmore Clutches are used with equal satisfaction in packaging machinery, industrial trucks, cranes, printing and bookbinding machinery and other equipment requiring a reliable, compact, durable, efficient multiple disc clutch. Investigate. Write today for complete information.



Pullmore Clutches are made in single and double types, for operation in oil or dry, in capacities up to 75 h.p.

ROCKFORD DRILLING MACHINE DIVISION

Borg-Warner Corporation, 300 Catherine Street, Rockford, Illinois Sold by MORSE CHAIN CO., Ithaca, N. Y. With offices in principal cities

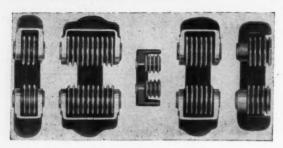


May

Re

the :

MATP



Types of J-S Roll Thread Snap Gages

tional double end thread gage with a "Go" plug at one end and a "Not Go" plug at the other, properly mounted in a duralumin handle. This plug is furnished in sizes from zero up to and including 2½ in. It is furnished as a single end plug in sizes of 2½ in. and larger. The threaded members are hardened, ground and lapped and are held within the limits of accuracy specified by the National Screw Thread Commission for Class X master gages. For setting J-S gages 2½ in. and larger, the J-S setting bar, which is a steel bar having annular rotatably mounted gag-

ing members at each end, is recommended as being most practical.

Ideal No. 10 Thermo-Grip Electric Pliers

The No. 5 Model Ideal Electric Pliers was introduced several months ago as a new and novel type of electrically heated soldering tool for small soldering work.

Shortly after this tool was placed on the market, there appeared a demand

there appeared a demand for a similar tool, which would handle larger work, and as a result the Ideal Commutator Dresser Company, 1445 Park Avenue, Sycamore, Illinois, has developed the Ideal No. 10 Electric Pliers, which will do work over twice the size of that for which the No. 5 is used.

The larger size Pliers are used for soldering lugs up to 1050 amp. or sweating pipe fittings up to 2½-in. diameter, under continuous operation. When used only intermittently, the No. 10 Pliers will handle pipe or fittings up to 4 in in diameter.



- QUIETNESS
- · RELIABILITY
- MAXIMUM
 PERFORMANCE



CENTRIFUGAL COOLANT PUMPS

THESE UNITS CAN BE MOUNTED IN ANY POSITION

AG3M1/4 H.P. BALL BEARING MOTOR25 G.P.M	10 FT. HEAD
AG4M	10 FT. HEAD
AG5M	10 FT. HEAD
AG6M70 G.P.M.	10 FT. HEAD

FULFLO SPECIALTIES CO., INC.

BLANCHESTER, OHIO

end, is g most

ermo-

Ideal intro-S 8g0 ype of dering

dering

arket. mand andle Tdea! 1445 has

ectric

twice

No. 5 r sol-

ating unused

4 in.

D

iers



Rotary Filing Punch in Drill Press 70 SHAPES & SIZES IN STOCK Send for Catalog and Price List. ROTARY FILE COMPANY



SPECIAL MACHINE BOLTS

Chromium Nickel Steel - Heat Treated For Milling Machines, Planers and Other Tools

SAVE THE MACHINE S-M-B Bolts preserve the machine bed. Cheap bolts, with uneven heads may ruin beds on costly machines by developing

SAVE THE JOB 8-M-B Bolts permit delicate, arm adjustments that hold throughout the job under the heaviest machine cuts.

SAVE TIME With S-M-B Bolts that are always accurate and always at hand in our Special S-M-B Bolt Racks.

WRITE FOR BOLT BULLETIN

BOYAR-SCHULTZ CORPORATION

2118 Walnut Street

Chicago, Illinois

TWO SHOP **NECESSITIES**

DESMOND DRESSERS AND CUTTERS



All of your grinding wheels will cut faster and more accurately if they are frequently dressed with Desmond Dressers. Let us advise the proper dresser for your wheels.

SIMPLEX VISES



The 100% solid steel slide makes these vises stronger and more serviceable and cost you no more. Replace your worn vises now with these modern vises.

Write for catalog M on Dressers and Vises and name of your nearest dealer.

DESMOND-STEPHAN MFG. CO.

URBANA, OHIO

May,

on ?

Re

\$4

ar

of

Save Time and Money



with the

ALTON TAP

Don't hold up production and waste a mechanic's valuable time in digging out broken taps. time in digging out broken taps. The Walton Tap Extractor offers an effective, instantaneous means of overcoming this loss. It extracts the broken tap without injury to the threads of the work. Saves cost of the labor and materials already in the piece of work. Made in two, three and four flute styles.

on 60 days free ffer. Send for detrial offer. Send for de-scriptive circular and price list No. 114.

THE WALTON CO.

98 Allyn St. Hartford, Conn.

Ideal Electric Pliers have outstanding features that can be used to advantage in the following ways: They sweat joints without unsweating adjacent connections, they hold work firmly while soldering, they heat the work evenly from



Ideal No. 10 Thermo-Grip Electric Pliers

both sides, and they eliminate open flame hazards.

The line current from which they operate is reduced to a harmless low voltage so no electric shock is possible.

"Victor" Screw Drivers with Composition Handles

A new line of "Victor" Screw Drivers for mechanics and others who prefer composition handle drivers is now avail-



GENESEE ADJUSTABLE HOLLOW MILLS

Are Cutting Costs Everywhere

DIFFERENT STYLES

Have Genesee cut your costs. We design and manufacture hundreds of special and multiple operation production tools. Send samples or blueprints now.

Write for catalog

GENESEE MFG. CO., Inc.

141 No. Water St., Rochester, N. Y.



Victor Screw Drivers

able. The handles are made of a tough cellulose material that is shockproof, will not soak up oil or water and is practically breakproof. Blades are made from special tempered steel and are anchored by heavy wings, making it impossible for them to turn in the handles. Driver tips are machine cross ground,

iding itage oints inec-

from

pen

opolt-

rers

le



SIEWEK Rapid Clamping Drill Jigs



Why not try one of our SIEWEK RAPID CLAMPING DRILL JIGS on your next drilling job.

They are fast, accurate and dependable.

When sending for catalog, give name, title and firm name.

SIEWEK TOOL CO.

FERNDALE, MICH.

R&S

BORING
HEADS
HAVE
GREATEST
RANGE
FOR THEIR
SIZE



R&S Offset Boring Heads are wide range tools, accurate to a split thousandth. No. 1 ($\frac{1}{2}$ " to $2\frac{1}{4}$ ")—\$35.00. No. 2 ($\frac{3}{4}$ " to 4")—\$45.00. No. 3 (1" to $5\frac{1}{2}$ ")—\$60.00. These limits are conservative and can be increased depending on the material and experience of the operator. May we send one on approval?

RICKERT-SHAFER CO., 1114 Cherry St., Erie, Pa.

May

G

246

which ensures accuracy.

These new screw drivers are made in a variety of sizes and styles to meet every requirement of the mechanic. Manufactured by Stanley Tools, New Britain, Conn.

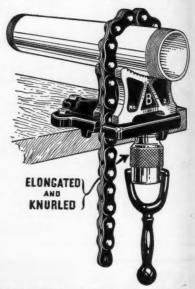
Billings & Spencer Improved Chain Pipe Vise

An improved chain pipe vise, the feature of which is the heavily knurled and elongated adjustment nut, has been placed on the market by The Billings





& Spencer Co., Park & Laurel Sts., Hartford, Conn. This new Billings feature provides a gripping surface for more rapidly taking up the slack in the chain. A partial turn of the handle is sufficient to clamp the pipe. Interference



Billings & Spencer Improved Chain Pipe Vise

between the handle and the bench is avoided.

This improved chain pipe vise with the exclusive Billings knurled adjustment nut is made entirely of steel. The base, handle and jaws are drop forged, the latter from special analysis tempered steel, scientifically heat treated. The chains are heavily constructed for rugged work. The vise is light in weight,



urture

Ore

in.

nce

is

10

d

GROBET FILES AND SAWS

for all types of filing machines.

Ask for our new catalog "K" illustrating more than 500 different files for such well-known machines as Oliver, Thiel, Cochrane - Bly, Illinois, etc.

Made by F. L. Grobet Leading precision file manufacturer. Ask also for catalog KNS filustrating more than 4,000 different Swiss precision files for hand work.

Grobet File Corp. of Am.
3 Park Place, New York City



Standardized
JIG BUSHINGS
Acme Standard
over 6700 items
A.S.A. Standard
over 4200 items



Acme Drill Jig Bushings are made by the most exacting, scientific methods —insuring long wear, accurate fit, and absolute satisfaction. A standardized product, carried in stock for prompt deivery in over 10,990 standarditems—all completely finished and ready for use. Special sizes made to order.

Send for bulletin, containing complete details, sizes available and low prices.



ACME INDUSTRIAL COMPANY

212 N. Laffin St., Chicago, Ill.





THIS MARK

The sign of DEPENDABLE ACCURATE GEARS of all TYPES and MATERIALS for all kinds of MACHINE TOOLS and FOR POWER TRANSMISSION EVERYWHERE.

Will be found only on

GEARS

made by

Diefendorf Gear Corporation
Syracuse, New York

May,

No B

Capa

110

PE

At 3

yet the drop forged construction insures maximum strength. It is made in four sizes with capacities from $\frac{1}{16}$ -in. to 8-in. pipe.

Packer Portable Polishing and Buffing Machine Vertical Type No. 1

For buffing the inside surfaces of bread and serving trays, comports, vegetable and salad dishes and similar hollow ware products, The Packer Ma-

NEAT STAMPING IN NAME PLATES

This machine quickly stamps details and serial numbers into name plates.

Write For Particulars

GEO. T. SCHMIDT, Inc. 1806 Belle Plaine Ave., Chicago, III. chine Co., Meriden, Conn., pioneer builder of automatic polishing and buffing machines, has brought out a vertical type portable polishing and buffing machine designated as "No. 1".

Standard equipment includes one oval chuck with a maximum diameter of



Packer Portable Polishing and Buffing Machine Vertical Type No. 1

21 in. A hand wheel is provided for controlling longitudinal adjustment of the stand. A vertical hand wheel is provided for raising and lowering the chuck for loading and unloading work. A crank handle mounted to the side of the chuck base permits adjustment for eccentric setting of the chuck. Standard equipment also includes a totally enclosed, dustproof ball bearing, 1½ hp. 1750 r.p.m. motor. The gear mechanism for the rotating chuck is contained in a dustproof oil reservoir.



nd

nd

al of

ne k.

ord

1-



No. 455 Angle Iron Combination

Shears, Notches and Bends a 2" x 2" x 1/4" angle iron in one minute flat.

Write for catalog on entire line.

No. 20 BALL BEARING PUNCH

Capacity 1/2" thru 14" iron.



WHITNEY METAL TOOL CO.

110 Forbes St.

Rockford, Ill.

At 30% of your old tooling cost when you use DRILL JIGS



Screw your bushing p'ates and vise Jaws on the "John's" Jig and do away with the building of a base and clamping device for

every Jig.

WRITE FOR LITERATUURE HEUSER MFG. CO.

1638 N. PAULINA ST.,



cam slide

PRECISION ADJUSTMENTS by simply peeling the paper-thin brass laminations from the LAMINUM shim! Machining, grinding and fitting are saved . . . service adjustments made quickly right at the machine instead

Order through your Mill Supply House

of tieing up production.

Also a complete line of brass and steel thin shim stock, and arbor spacers.

LAMINATED SHIM COMPANY, INC. Mfrs. . . . Long Island City, New York



May

"A Manual of Metal Cutting Practice" is the title of a booklet describing a machine for cutting bar stock which is said to produce a maximum number of cuts with an exceedingly small amount of waste. Copy free by addressing Metal Saw & Machine Co., Inc., Dept. 437-A, Springfield, Massachusetts.

Severance Midget Milling Cutters. Seventeen different shapes in 114 different sizes of milling cutters designed for use with flexible shaft equipment for finishing of dies, tools, and other fine work are described and illustrated in a catalog that is being issued by Severance Tool Manufacturing Co., 1516 E. Genesee Ave., Saginaw, Mich. The catalog lists 170 different Severance tools. Copy free upon request.

"Yes, It's Dust!" is the title of a fourpage folder featuring the advantages and economies that are to be obtained through the use of Pangborn Dust Collectors. Four views of Pangborn Dust Collectors in operation at representative industrial plants are shown and the problems involved at each installation are described. Copy free by addressing Pangborn Corporation, Hagerstown, Maryland.

"Fostoria Engineered Localized Lighting" is the title of a 14-page, 8½x11 size booklet which has been brought out by The Fostoria Pressed Steel Corporation, Fostoria, Ohio, to present modern factory lighting equipment. The folder describes the complete line of Fostoria Localite lamps, reflectors, supporting arms, brackets and other equipment included in this line. Copy free upon request.

Colloidal Graphite as an Impregnating Material. The technic employed for the impregnation of porous materials with dispersions of colloidal graphite depends upon the nature of the solid to be impregnated, the characteristics of the carrier and the properties of the solid. Bulletins No. A260.1 and No. B260.1 comprise a theoretical consideration of these peculiarities with regard to their effect upon the impregnation of porous bodies with colloidal graphite and a discussion of experimental and production methods for obtaining the desired properties. Copies of these bulletins may be obtained by addressing Acheson Colloids Corporation, Port Huron, Michigan.





1937 ance

ene-

Copy

ourtages

ined Col-

Dust ative the

tion sing own,

ght-

x11 out

oraiern

lder oria

ting in-

pon

ting

the vith nds im-

car-

Bulom-Tect

dies sion th-

ties.

obable

SWISS PATTERN **FILES**

MADE IN AMERICA

files of precision

TRADE MARK

QUALITY



PRECISION

It is a guide to users in their file purchases.

AMERICAN SWISS Files are quality precision tools. reputation for long life, keener filing edges, better results and lower filing costs has been earned by actual use in the hands of skilled mechanics.

AMERICAN SWISS FILE & TOOL CO.

ELIZABETH

NEW JERSEY

Buy from the Distributor Also Manufacturers of Mechanics Hand Tools and Knurls

VICTOR "MOLY"

VICTOR "MOLY" BLADES make hard cutting jobs easy

Shape, size, hardness, toughness of materials to be cut mean nothing to Victor "Moly" hack saw blades. They cut faster and truer at less cost on all metal saving operations.

Try one on your next job. Ask for Victor "Moly", the distinctive gold colored blade. Sold only through established distributors.

10 CLOT

VICTOR SAW WORKS, INC.

MIDDLETOWN, N. Y.

Tool Steel Simplified. By Frank R. Palmer, Assistant to the President, Carpenter Steel Company. 316 pages, 6x9 in. Published by Carpenter Steel Company, Reading, Pa. Price, \$1.00.

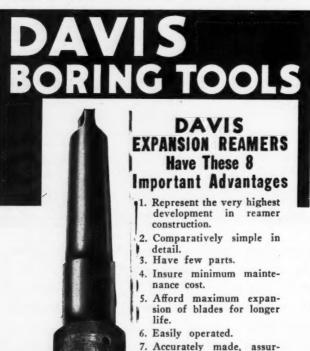
This book is addressed to the men in industry who are responsible for the design, making or heat treating of tools. Its purpose is to present simplified methods for selecting and heat treating the proper tool steel to make any kind of tool. The book is divided into five parts, taking up in turn the subjects "Getting Acquainted with Tool Steel", "Selecting the Right Tool Steel for Each Kind of Tool", "Properties, Heat Treatment and Testing of Tool Steel", "Things

Worth Knowing", and "Tables". Included in the text are discussions of tool steel terms, the analysis of tool steel, the timbre or personality of tool steel, the matched set method, heat treating method and equipment, hardness and toughness testing, relation of design to heat treatment, furnace atmosphere, quenching, and many other subjects relative to the working of tool steels.

The book is profusely illustrated with

The book is profusely illustrated with photographs and drawings, including a color plate showing the timbre colors of plain carbon steel at various temperatures. This book should be invaluable to any mechanic or executive who is concerned with the purchase, heat treat-

ment or uses of tool steels.



ing uniform results.

ing requirement.

6200 Maple Ave.

Furnished in a wide variety of styles and sizes to

take care of every ream-

DAVIS BORING TOOL CO., Inc.

ST. LOUIS, MO.

Bijur Automatic **Lubricating System** Bulletin D. The use of automatic lubrication on mechanical units of all kinds is increasing rapidly. Still, there is a great deal to be done along this line and there are many manufac-turers and engi-neers who are as yet unacquainted with the details involved in the application of automatic lubrication to their products. This 16-page book, published by Bijur Lubricating Corporation, Long Island City, N. Y., is intended to supply the needed information. The book is replete with photographs and drawings illustrating the operation of the Bijur system, the manner in which the system is applied to various mechanical units and the variety of the units upon which this system is used. Copy free to any mechanical engi-

neer or executive.

Intool teel,

tecl, ting and

nere, jects ls.

with ig a s of

eraable o is eatof

atic

tem The

atic

of

indly.

a be

this

ac-

agi-

ted

he

au-

ion

cts.

Bi-

ng ng Y.,

ip-

he

te

hs

18-

ra-

lur

n-

he

nhe

its nis ed. ny i-



Where there's a metal cleaning job to be done better . . . whether it is cleaning before plating, enameling or japanning . . . removing insoluble smuts . . . stripping finishes . . . you can effect new, surprising economies through the use of Oakite materials.

Speedy, dependable Oakite action reduces cleaning time to a minimum. Because it avoids the delays and rejects that hold-up production, Oakite cleaning is found today in hundreds of plants where QUALITY and FAST PRODUCTION count.

It will pay you to investigate Oakite materials and methods. Write for helpful data on your specific work.

Branch offices and Representatives in all principal cities of the U.S.

Manufactured only by

OAKITE PRODUCTS, INC.

36 Thames St., New York, N. Y.

CAKITE

SPICIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS



HERE'S the wonder tool that is effecting laboratories, model and tool rooms and on production lines. Hard-to-get-at places on machines can now be repaired without removing the part or dismantling machine. The Handee uses 200 different accessories, instantly interchangeable, for work on all metals, alloys, bakelite, celluloid, wood, glass, resins and other hard substances.

Finest, speediest, most powerful tool for its type. 25,000 r.p.m. AC or DC, 110 volts. Weighs only 12 ounces. No shop or factory can afford to be without the Handee. Try one.

Order Today on 10 Days Trial or Send for Catalog. De Luxe \$1850
Model
Postpaid
6 Accessories Free

Chicago Wheel & Mfg. Co.

1101 W. Monroe St., Dept. 00, Chicago, III.

			M. M. S. 5	
Send Catalog Send De Luxe	Handee	on	10-Day	Trial
Name	*************	*****		
Address				*******
CIA-		C4.	40	

Evans Flexible Valve Seat Reamer. The valve seat reamers, piston pin reamers, valve seat cutters and pilots, ball bearing valve seat and cutter grinder, and equipment comprising the Evans Reaming Shop are fully described and illustrated in a 12-page folder that is being issued by Evans Flexible Reamer Corporation, 3656 Lincoln Ave., Chicago, Ill. Copy free upon request.

Oliver Universal Tool and Cutter Grinder. This four-page folder now being distributed by Oliver Instrument Company, 1430 Maumee St., Adrian, Mich., is devoted to the features and advantages of the Oliver Universal Tool and

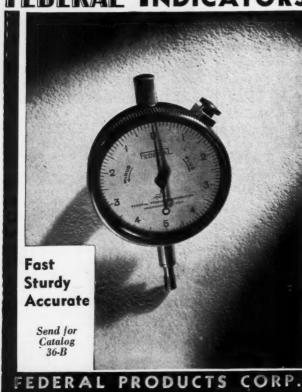
Cutter Grinder. A series of illustrations show the grinder in use for sharpening taper spiral reamers, helical milling cutters, gear cutters, formed cutters, dove tail cutters, and side milling cutters. Specifications are included. Copy free upon request.

Cold Drawn Steels and Drill Rods. The advantages available through the use of high grade cold drawn steels are presented in this book—Catalog No. 3—which has been made available to the industry by the Pittsburgh Tool Steel Wire Co., Monaca, Pa. The text stresses the advantages of accuracy of size, trueness to section, smooth surface finish,

machinability, and improved physicals attained by cold drawing. Illustrated and described are scale pivot and bearing steel, cold drawn keystock, pawl and cam shapes, dental steels, dental bur wire, needle bar stock. stainless steels, balance staff wire, spring steel, cold drawn file steel, nail set and punch steel, cold drawn iron, and cold drawn special shapes. Carbon steel and high speed steel drill rods are listed by sizes, weights, and prices. Tables are included giving the decimal equivalents of weights and areas for various shapes, also a hardness conversion table, wire gage table, S.A.E. composichemical tion table, and a chapter devoted to general recommendations for heat treatment of tool steels. Copy free upon request.

Please mention Modern Machine Shop when writing to advertisers. Your cooperation will be appreciated both by the advertiser and the publishers of this magazine.

FEDERAL INDICATORS



1144 EDDY STREET, PROVIDENCE R. I.
Detroit · Chicago · Muncia · Cleveland · New Ye

The Tools sign,

May,

tures made Cleve page tribu design low princ

princ turn, use c cycle clude ecutiv

MI

0

...

in High

23:

ions

ning

cutove-

ters.

free

The

of

re-

3_

the

teel

sea uesh, nd

als ld

ed are

nd old k.

m

ls. e,

k. 1-

e,

ld 11

1.

n,

3n

d

e

5.

d

ı Í

8 3,

The Facts About High Cycle Electric Tools. A complete exposition of the design, construction, and outstanding fea-tures of the high cycle portable tools made by The Rotor Air Tool Company, Cleveland, Ohio, is contained in a 12page booklet that is now being distributed by this firm. The subjects of design, power, speed, weight, power cost, low maintenance cost, and advanced principles of design are discussed in turn, the text being illustrated by the use of a cross section of a Rotor high Specifications are incycle grinder. cluded. Copy free to machine shop executives upon request.





MICHIGAN AVENUE IN

CHICAGO



HOTEL AUDITORIU

Here's a hotel value for you. A large room right at the edge of the Loop, with every comfort and luxury at a rate surprisingly low.

GEO. H. MINK, MANAGER Rooms from \$2.00

STEEL SHELL

PERMANENT DEPENDABLE

HIGH GRADE SHELVING AT A LOW PRICE

Unit No. 28, 36" w. x 12" d. x 7'3" h. 72 Bins '6" x 6" h. 6 B.ns 6" x 12" h. GREEN FINISH



Parent Metal Products, Inc. 1703-15 RITTENHOUSE ST., PHILA., PA



STEEL PIANO HINGES

itandard Open Widths-1 1/16"-11/4" - 11/2"

Stock Lengths-48" - 60" - 72" Ga. .040 CR Steel. No. 10 Bross Pin.

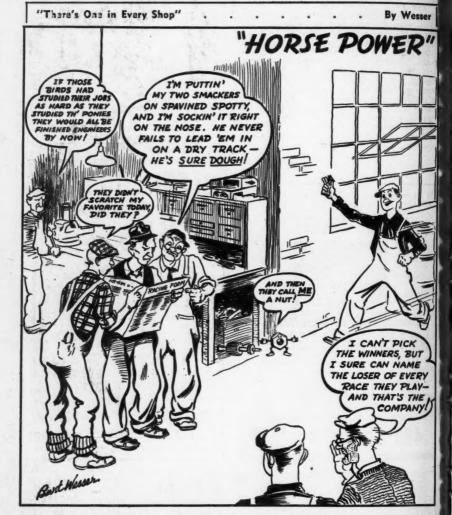
Stocked without Holes. STOCKED BY LEADING JOBBERS. Descriptive information on request.

AUTO MOULDING & MFG. CO.

2328 S. CANAL STREET

HINGE DIV.

CHICAGO



Magnetic Relays: Bulletin 81 listing more than 100 relays for Intermediate Duty (10-15 amperes) on D.C. and A.C. circuits for two and three wire control. The bulletin gives valuable coil and contact data, contact arrangements, enclosures, and illustrates relays assembled from standard parts for use on special applications: Copy free by addressing Ward Leonard Electric Co., Mount Vernon, New York.

Janette Bulletin 226 of Precision Built Electrical Apparatus. This bulletin illustrates and describes the line of motorized speed reducers, inverted rotary converters, motorized blowers, direct and alternating current motors, hydrolators, blower wheels, motor generators, gasoline electric plants, and other equipment made by the Janette Mfg. Co., 550 W. Monroe St., Chlcago, Ill. Copy free.

Modern Machine Shop

THE Efficient SURFACE GRINDING UNIT

Most efficient because of its light weight, because of its simplicity of set-up, because when once on the grinder it does not need to be removed for installation of segments.

The special Sterling type of segment has become widely known because of its ease of mounting, because of its uniformity of production, its cool surfacing action and the finish it produces. We suggest an investigation of this most efficient unit.

THE STERLING GRINDING WHEEL CO.

Abresive Division of The Cleveland Quarries Co.
Factory and Office: TIFFIN, OHIO

CHICAGO 912 W Washington Blvd. + DETROIT 101-107 W Western Avi

STEELING & ABBRASIVES

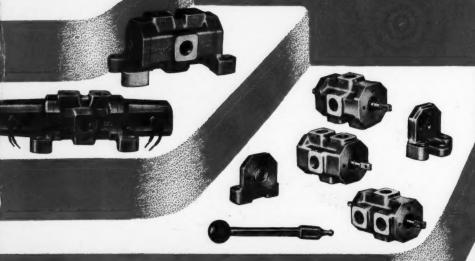
"LOGAN" HYDRAULIC VALVES

SAVE — TIME EFFORT MOTION NEW Logan Hydraulic Control Valves are now available with Balanced Four

Way Piston Type Construction for hand, foot, solenoid, cam, pilot or latch operation. Latch, cam, and solenoid types are pictured, also view of body of the valve in three positions. The body is so designed that it may be rotated in relation to the end covers, easily bringing the several pipe connections into the position required for most efficient piping.

This adjustable feature eliminates the use of special valves, reduces internal friction, fitting and labor costs. The piston is of balanced type construction. No packing is necessary.

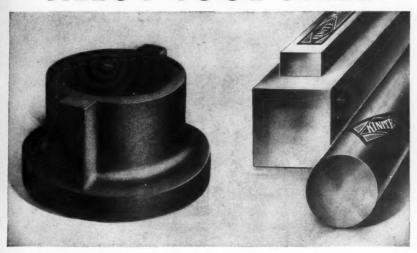
Write for complete Hydraulic Valve



LOGANSPORT MACHINE INC., LOGANSPORT, IND.



ALLOY TOOL STEEL



- * Lasts three to six times longer than ordinary steels
- * Hardens in still air eliminating distortions and cracking
- * Takes a high polish, reducing friction in moving parts
- ★ Furnished in an annealed condition—easy to machine

CAST-TO-SHAPE or IN ROLLED BARS

Our foundry can cast Kinite to practically any shape leaving just enough excess material for the final finishing cut. On many jobs this means a great saving in material and labor costs, but for dies and other tools that can be made economically from bars, we stock a full range of flats, rounds, and squares. Thus we can recommend which to use for your particular job. Write for the new Kinite Booklet. It explains in detail how this remarkable steel cuts the cost of tool making.

H. BOKER & CO., INC.

103 Duane Street

111

8-

r

3-

nd

s, j-

New York, N. Y.

See your supplier for



U. S. 7" Utility Bench Grinder.



U. S. Vertical Feed Angle Plate Grinder Sizes 8" to 14".



reliable U.S. electrical tool

Every U. S. Electrical Tool is built to meet a definite us mand . . . the demand for tools that give one and better service at lower cost U. S. can many your every requirement in a pactrical tools with its complete line of Drills, Grinders Buffers, Polishers, and Fexible Sharmachines.

THE UNITED STATES

ELECTRICAL TOOL CO

THE STANDARD OF QUALITY SINGE 1897

2471 WEST SIXTH ST.

CINCINNATI, OHIO

ool is cost ver took Pol-Shat CO.